Natural HISTORY

OF

IRELAND, In Three Parts.

By SEVERAL HANDS.

PART I. Being a true and ample Description of its Situation, Greatness, Shape, and nature; Of its Hills, Woods, Heaths, Bogs; Of its fruitful Parts and profitable Grounds, with the several ways of Manuring and Improving the same; With its Heads or Promontories, Harbours, Roads and Bays; Of its Springs and Fountains, Brooks, Rivers, Loughs; Of its Metals, Minerals, Freestone, Marble, Sea coal, Turf, and other things that are taken out of the Ground. And lastly, of the Nature and Temperature of its Air and Season, and what Diseases it is free from, or subject unto. Conducing to the Advancement of Navigation, Husbandry,

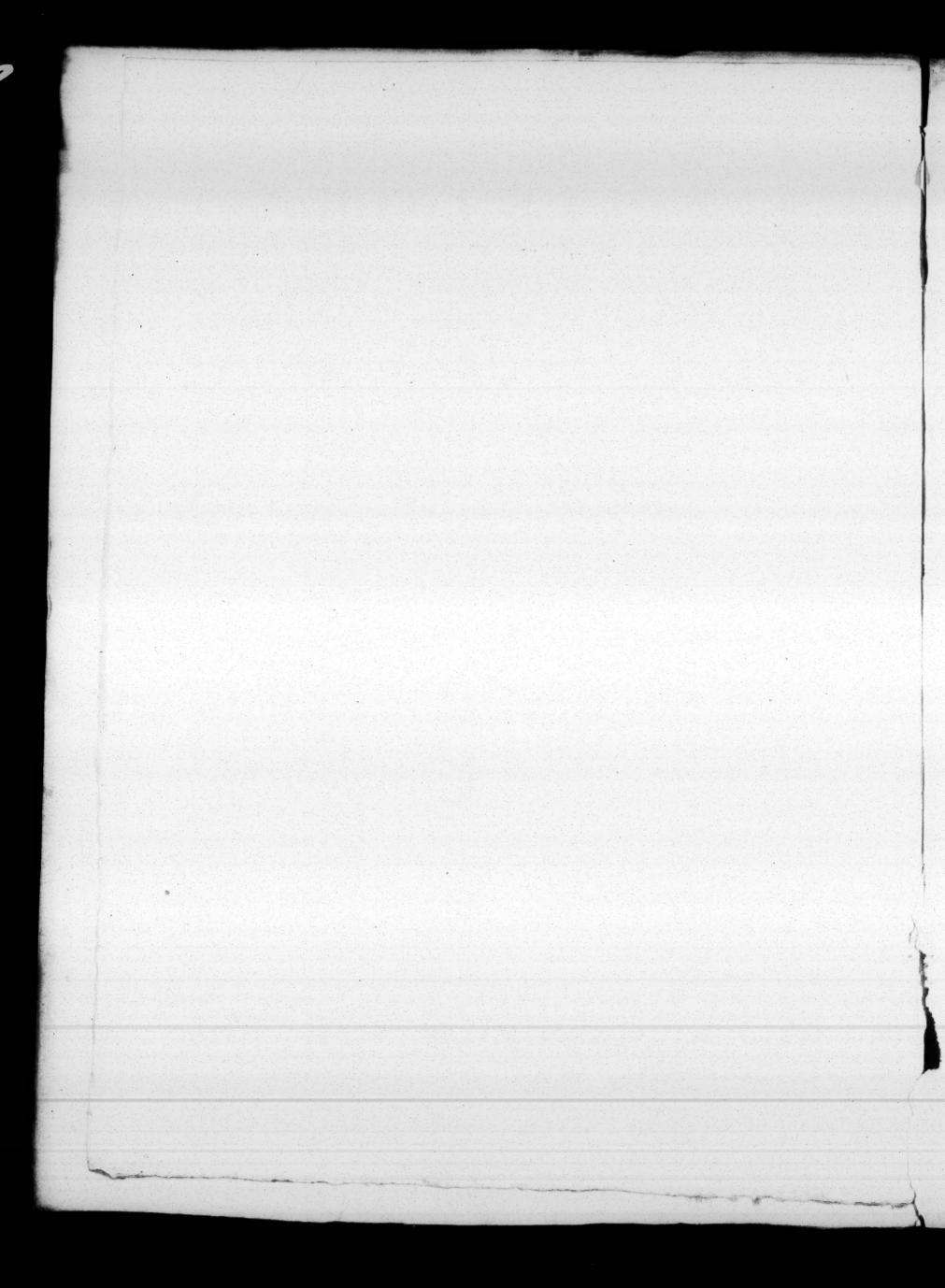
and other profitable Arts and Professions. Written by Gerard Boate, late Doctor of Physick to the State in Ireland.

PART II. A Collection of fuch Papers as were communicated to the Royal Society, referring to some Curiosities in *Ireland*: As also a Manuscript. By his Grace the Lord Archbishop of *Dublin*.

PART III. A Discourse concerning the Danish Mounts. Forts and Towers in Ireland; never before published. By Thomas Molyneux, M. D. F. R. S. in England.

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THE

Natural History

OF

IRELAND.

CHAP. I.

Of the Situation, Shape, and Greatness of Ireland: It's Division into Provinces and Counties: Of the English Pale: The principal Towns of that Nation:

SECT. I.

Situation of IRELAND.



RELAND, by the Irish themselves called Erin, and by their neighbours the Welsh, Yverdon, lieth in the north-west ocean, having on the west side no land nearer than America, or the West Indies, and thereof that part, which above Nova Francia and Canada running northward, hath of the English received the name of New Britain, but of other nations before of Terra Laboratoris. The next land over against it on the south is Galicia, one of the king-

doms of Spain, from which it lieth divided some days sailing. Northwards it hath the Scotish islands, by the geographers called Hebrides or Hebudes; the

principal of which are Eust, Lewis, Skye, Ila and Mula. On the east side is Great-Britain, and all the three parts of it, to wit part of Scotland, the whole west coast of England, and all Wales.

SECT. II.

Distance betwixt Ireland and several places upon the coast of Great-Britain.

T' HE sea, which parteth Ireland from Great-Britain, being of a very unequal breadth, is more narrow in the north end, less in the south end, but broad in the midst, as far as it washeth the English coast, being the full length of the two counties of Cumberland and Lancashire, opposite against which are situated in Ireland the counties of Down, Louth, and Dublin. The sea which is inclosed betwixt these counties, and compriseth in its middle the isle of Man, is well near of an equal and uniform breadth every where, not being in any place much broader or much narrower, than it is betwixt the havens of Dublin and Leverpole, the distance betwixt which two is reckoned by the English pilots to be of forty leagues, or fixscore English miles. But Wales in two or three places cometh a great deal nearer to Ireland, and in some as near again. For Holy-head, being the most westerly corner of the northerliest part of Wales, called Anglesey, lieth just half way between Dublin and Leverpole or Chester, being twenty leagues, or threefcore miles, from Dublin, and ten or twelve hours fail with a reasonable good wind; which distance is no greater, than what the eye may very well reach: for a man whose fight is but of an ordinary goodness, may at any time in clear weather with ease discern the high and mountainous coast of Wales from the top of the Dublin mountains. And about the fame distance, as is betwixt Dublin and Holy-head, is also betwixt St. Davishead a promontory of Pembrookshire (which shire is situated in the most south west part of Wales) and the Irish promontory in the county of Wexford, which the natives call Cancarne, and the English seamen Tuskard-point. Also the promontory of Carnarvan in Wales, called Brachipult-point, and lying betwixt Holy-head and St. Davis, is well near at the same distance from the next Irish shore, as either of those other Welsh promontories. But between Brachipultpoint and St. Davis-head the sea doth much enlarge it self (although nothing so much as betwixt Ireland and England) making a great inlet on the coast of Wales, the which here retireth it self a great way backwards: whereas to the contrary the Irish shore, which lieth opposite to it, extendeth it self in an equal manner, without any great bays or inlets.

As for the north part, where Ireland and Scotland are neighbours, there this fea groweth very narrow; insomuch as Galloway, a county in that part of Scotland, is distant with its most westerly shore from the Ardes (a little country and demy-island so named in the most northerly part of the county of Down in Ireland) not above five leagues; which space the open boats, wherein they ordinarily here do pass from the one kingdom into the other, use to sail in three or four hours time: and Cantyre, another foreland on the west shore of Scotland,

more to the north than Galloway, is nearer yet unto Ireland: so that in these two places the one nation may perfectly be seen and discerned out of the other at all times, whensoever it is no very dark gloomy weather.

SECT. III.

Shape and Bigness of IRELAND.

THE shape of this island is longways square, but not fully: for to say nothing of several corners and forelands, which run out a great way into the sea, nor of divers great bays and inlets, which the sea maketh here and there, in the three other parts of this island; the fourth part, called Munster, doth greatly alter that sigure; for in lieu of stretching it self first from the north to the south, and then from the south to the west, it runneth altogether sloping from the north east to the south west; and there besides it stretchest it self much further into the sea with its western shores, than any other part of Ireland on the same west side.

As for the bigness thereof, questionless it is to be reckon'd among the chief islands of the whole world; and of Europe the principallest of all, except only Great-Britain, the which is more than twice as big: for being as long again, as it is broad, it is at the narrowest (which is just in the middle, where Dublin is fituated) no less than an hundred miles broad; seeing that Athlone, which lieth just half way betwixt the two seas, is fifty miles distant from Dublin; and in Ulster, where Ireland is at its broadest, it is in most places ten, or twelve, and in some twenty miles broader. In the length, if from the middle of the northern coast one do go directly southward, one shall find it to be about two hundred miles. But if you shape your course more to the east, the length will be found less by some miles, because the coast of Munster runneth so sloping, as we have said before: and to the contrary, if one measure the length of Ireland more to the west, it will be found to be a great deal more than two hundred miles. And if the measure were taken not through the inland parts, as now we have framed it, but all along the fea shore, the length would amount to a great deal more than what now we have declared (as well on the cast as on the west side) in regard of the inequality of the coast, and of the great bays and forelands, which make it in most places very much run out to the seaward, or into the landward: for which same reason the circuit of the whole island, taken alongst the shore, is by far greater, than otherwise the proportion of its length and breadth would seem to require. The miles here mentioned must be understood not of the common English ones, three whereof make one league, or Holland mile, but of the Irish, the which are about one fifth part bigger, so as five Irish miles do amount to about six English.

SECT.

SECT. IV.

Division of Ireland into Provinces and Counties.

This island is divided into four principal parts, called provinces, viz. Ulfter, Leinster, Connaught, and Munster: of which the first and the last extend themselves from the one sea to the other, Ulster in the north, and Munster in the south. Leinster and Connaught, lying betwixt those two forenamed provinces, have the sea only on one side, Connaught on the west, and Leinster on the east. To these four most writers and records add a fifth, called Meath; but that is really a part of Leinster, and ordinarily now is held to be such.

Each of these provinces is again divided into divers counties. Ulster hath eleven, whereof six on the sea side, viz. Fermanagh, Donegall alias Tirconnel, Colrain, Antrim, Down, Louth; and sive within the land, viz. Cavan, Monaghan, Ardmagh, Nether-Tyrone, and Upper-Tyrone. Leinster comprehendeth likewise eleven counties, Dublin, Wicklow, and Wexford one the sea side, East-Meath, and Catherlogh or Carlo within the land, but with a little nook reaching unto the sea; West-Meath, Kildare, Kilkenny, King's-county, Queen's-county, and Longford altogether within the land. Munster is divided into six counties, two within the land, viz. Tipperary and Limerick; and the other four, Waterford, Cork, Desmond, and Kerry, situated on the sea side, but stretching themselves a great way into the land. In Connaught there be six counties, viz. Clare alias Tomond, Galloway, Mayo, and Slego, situated on the sea, and Roscommon, and Letrim within the land.

SECT. V.

Of the English Pale.

There is yet another division of Ireland, whereby the whole land is divided into two parts, The English Pale, and the land of the mere Irish. The English Pale comprehendeth only four counties, one whereof is in Ulster, viz. Louth, and the other three in Leinster, to wit Meath, Dublin, and Kildare: the original of which division is this. The English at the first conquest, under the reign of Henry II. having within a little time conquered great part of Ireland, did afterwards, in the space of not very many years, make themselves masters of almost all the rest, having expelled the natives (called the wild Irish, because that in all manner of wildness they may be compared with the most barbarous nations of the earth) into the desart woods and mountains. But afterwards being fallen at odds among themselves, and making several great wars the one upon the other, the Irish thereby got the opportunity to recover now this, and

and then that part of the land; whereby, and through the degenerating of a great many from time to time, who joining themselves with the Irish, took upon them their wild fashions and their language, the English in length of time came to be so much weakened, that at last nothing remained to them of the whole kingdom, worth the speaking of, but the great cities, and the forenamed four counties; to whom the name of Pale was given, because that the authority and government of the kings of England, and the English colonies or plantations, which before had been spread over the whole land, now were reduced to so small a compass, and as it were impaled within the same. And although since the beginning of this present age, and fince king James's coming to the crown of England, the whole island was reduced under the obedience and government of the English laws, and replenished with English and Scotish colonies; nevertheless the name of English Pale, which in the old signification was now out of season, remained in use, and is so still, even since this last bloody rebellion, wherein the inhabitants of almost all the Pale, although all of them of English descent, have conspired with the native Irish, for to shake off the government of the crown of England, and utterly to extinguish the reformed Religion, with all the professors thereof, and quite to root them out of Ireland.

SECT. VI.

Cities and chief Towns of Ireland.

This island hath in it several cities, among which Dublin is the principal, being the chief city of the whole commonwealth, the residence of the governor, the council of state, all the great officers, the exchequer, judges, and courts of justice; being also adorn'd with an university, the only in all Ireland. It is situated in the province of Leinster, about the middle of the length of Ireland (as already hath been mentioned) not far from the Sea, an inlet whereof maketh a harbour for this city; which harbour, although none of the best of Ireland (whereof in the next chapter but one shall be spoken more at large) is nevertheless frequented with more ships, and hath greater importation of all things, than any other haven in the kingdom; by reason that all forts of commodities are much more readily and in greater plenty vented here than any where else, what in the city it self, being great and populous, what into the country, for in the time of peace almost all Leinster and Ulster were wont to surnish themselves from Dublin of all kinds of provisions and necessaries, such as were brought in our of foreign countries.

Next to Dublin is Galloway, the head city of the province of Connaught, to be reckon'd, as well for bigness and fairness, as for riches; for the streets are wide, and handsomely ordered, the houses for the most part built of free-stone; and the inhabitants much addicted to traffick, do greatly trade into other countries, especially into Spain, from whence they used to fetch great store of wines

and other wares every year.

In the third place cometh Waterford, situated in the province of Munster; and in the fourth Limerick, the head city of the said province, both towns

of traffick, fituated on goodly havens, and of reasonable bigness and handsom-ness.

Cork, in the province of Munster, and Londonderry, in the province of Ulster, are less than any of the forementioned, but otherwise handsome places, well built, and very fitly situated for traffick and navigation, as standing upon

very good havens.

As for the rest of the towns, Drogheda, Kilkenny, and Bandonbridge are passable and worthy of some regard both for bigness and handsomness: but Colrain, Knockfergus, Belrast, Dundalk, Wexford, Youghal, and Kinsale are of small moment, the best of all these being hardly comparable to any of those fair market towns, which are to be found in almost all parts of England. And as for Cassel, Rosse, Lismore, Clonmell, and Kilmallock in Munster; Slego and Athlone in Connaught; Mullingar, Trim, Kells, Navan, Athboy, Naas, Carlow, Arklow, and Wicklow in Leinster; Carlingford, Atherdee, and Down in Ulster, all of them walled towns, they are scarce worth the mentioning, because there are sew market towns in England, even of the meanest, which are not as good or better, than the best of them all. We could give a more pertect relation of this particular: but because this serveth little to our purpose, and properly doth not concern the natural history, we have thought it best to touch it but briefly.

CHAP. II.

Of the principal Havens of IRELAND.

SECT. I.

Waterford Haven.

HE havens of Ireland are so many in number, and for the most part so fair and large, that in this particular hardly any land in the whole world may be compared with this, as will easily appear by the particular rehearsal thereof, which we are now to make, first of the best and chiefest in this chapter, and of the others in the next. We shall begin with Waterford haven, the which being situated on the confines of Leinster and Munster, runneth some seven or eight miles into the land, not winding or crooked, nor with any great nookes or inlets, but almost in a straight line, (extending in it self north and north by west) and in most parts of an equal breadth, all the way deep and clear, having no rocks or sands, but only two or three little ones, which lying not across nor in the midst, but by the sides, may be shunned very easily. Without the harbour it is eleven and twelve sathoms deep, in the mouth

seven and more, inwards six fathoms. Within the easterly corner is a good road, in four or five fathoms; and on the other or westerly side, sive or six miles from the mouth, is another good road, very commodious as well for them who go forth, as those that will sail upward to Waterford. Upon the east side, about half way the length, lieth a very strong castle called Duncannon, which so commandeth this harbour, as no ships can go up or down against the will of

those in the fort, without running extreme hazard.

This haven in the end divideth it self into two arms, both a great deal inferior to the principal harbour in breadth and depth, but yet such as are capable of ships of a good big port, especially the lest, which runneth westward to the city of Waterford, whereof this whole haven beareth the name, being situated some four or five miles from that division, and a little below the place where the river Shure falleth into this harbour. The right arm being the mouth of the river Barrow, and extending it self straight along, goeth up to Ross, (a town in former times samous for trade) the which is much about the same distance from this division, as the division is from the mouth of the harbour.

SECT. II.

Carlingford Haven.

On the whole coast of Leinster there is not one fair large harbour, so as the next good haven from Waterford northwards is that of Carlingford; which two harbours, in sailing straight along the coast, are above an hundred miles distant.

This haven is some three or sour miles long, and nigh of the same breadth, being every where very deep, so as the biggest ships may come there to an anchor; and so inviron'd with high land and mountains on all sides, that the ships do lye detended off all winds; so that this would be one of the best havens of the world, if it were not for the difficulty and danger of the entrance, the mouth being sull of rocks, both blind ones and others, betwixt which the passages are very narrow: whereby it cometh that this harbour is very little frequented by any great ships, the rather because there is no traffick at all, nor any good town seated on this haven. For the town of Carlingford, whose name it beareth, is a very poor place, hardly worth the speaking of. About eight miles from the mouth of the harbour is the Newry, a fine little town, until in this late bloody rebellion it was for the greatest part destroyed by the Irish: by which town passeth a little river, called the Newry-water, which discharging it self into the harbour some four or sive miles below the Newry, is not portable but of very little barks and boats, and that only when the tide is in.

SECT. III.

Strangford Haven, and that of Knockfergus.

ABOUT thirty miles northwards from Carlingford haven is the haven of Strangford, the which in its entrance is almost as much incumbred with rocks of both kinds, as that of Carlingford. It is some five or six miles long, and beareth north westward, being the mouth of a great lough, called Lough Cone; the which being but two or three miles broad in most places, but some fifteen or sixteen long, doth ebb and flow until the utmost ends of it: so that there goeth a very strong tide in this harbour, which makes the same the unsafer, especially in great storms and high winds, for which there is no great desence here. On this haven, and on the neighbouring lough, there lyeth never a good town,

Strangford being more inconsiderable yet than Carlingford.

The next great harbour upon this coast, and about twenty miles more to the north, is that of Knocksergus, being a great wide bay, the which in its mouth, betwixt the southern and the northern point, is no less than ten or twelve miles broad, growing narrower by degrees, the farther it goeth into the land, the which it doth for the space of fifteen miles, as far as to the town of Belfast, where a little river called Lagon (not portable but of small boats) salleth into this harbour. In this bay is a reasonable good road before the town of Knocksergus (seated about nine miles within the land,) where it is good anchoring in three sathoms, and three and a half. On the north side of the bay, somewhat near the sea, under a castle called Mouse-hill, is a sand bay, where it is good anchoring for all forts of ships, as well great as small ones, for the north and north west winds: but bad riding for the south west.

SECT. IV.

Sheep Haven, Lough Swilly, and Lough Foyle.

The three forementioned havens of Carlingford, Strangford, Knockfergus, are all in the province of Ulster, on the east side thereos. The said province hath also three good havens on its northern coast, not very far distant the one from the other. viz. Sheep haven, Lough Swilly, and Lough Foyle. Every one of these is a Lough (which the very name of the second and third sufficiently testissieth) opening it self into the sea: of the which Sheep haven and Lough Swilly altho' they be fair large harbours, as well as Lough Foyle, and that ships may ride there defended off all winds, Lough Swilly being also of sufficient bigness to contain a thousand great vessels, yet they are very little frequented, because there is not any trade nor traffick, nor any good town placed upon or near them.

Lough

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Lough Foyle is of a great bigness, at least twelve miles long, and in most places five or fix miles broad, being almost every where of an equal breadth, except at the two ends, where it groweth narrow, being of an oval figure. For at the mouth, betwixt Magilligan's point and Greencastle, it is hardly a mile and a half broad: and at the other end it is much narrower yet, running from thence with a long arm some miles into the country, being liker to a broad river, than to a lough. Upon this arm, three or four miles from the great lough, is the town of Londonderry, in a place where that arm turneth and windeth it self in that manner, as it invironeth the town on three sides. It is nothing big, confisting only of two long streets, the which cut one another cross-ways in the midft; but it is very handsome, the streets being broad and well paved, the houses some stories high, and built for the most of freestone, with a handsome church, market place, and key: and is inclosed with a thick and very strong wall, being one of the principal fortresses of Ireland. It is but few years old, having been built up from the ground by a company of London adventurers under the reign of king James. Before the mouth of this lough lieth a great fand, called the Touns (upon which it burneth greatly, when the wind bloweth from the lea) but so as a fair broad and deep channel remaineth betwixt the faid fand and the west side of the land, where there is at all times fourteen and fifteen fathoms of water, as in the mouth it felf some eight or ten. Entring into the lough, there are very great fands on the left hand, from the one end to the other, which are some miles broad from off the land; and of the right hand are some little sands or shelves here, lying close to the land. Betwixt these runneth a broad channel in most parts three and four fathoms deep: and in that arm, whereon Londonderry standeth, it is deeper yet, in some places no less than ten or twelve, and before the town four and five fathoms: so as this is one of the best and most commodious harbours of all the land.

SECT. V.

Kilbeg and Dunnagall Haven.

The country of Tirconnel, the which taketh up the whole west side of the province of Ulster, runneth a great way into the sea with its southern part, on the south side of which foreland there are two very sair havens, the one not sar from the other, vix. Kilbeg and Dunnagall haven. Kilbeg is a fair round bay, where the greatest ships that go upon the seas, may at all times with their sull lading enter and come to an anchor; being distant about twelve miles from Cape de Telling, the outmost or most western point of that forenamed foreland of Tirconnel. The entrance is very narrow, so as unto them who are coming to it, there seemeth to be no opening there, until they are very near, but it is very clean, as well in the mouth, as in the bay it self, and nothing that can hurt the ships either coming in or going forth, being entred, one may anchor where one will, in five, six, seven, eight fathoms, or more.

Three or four miles to the fouth from Kilbeg is a cape, call'd St. John's point, and fix or feven miles eastward from the said cape is Dunnagall haven, wide and deep enough, but in the entrance greatly incumbred with shelves, sands, and rocks, so as great care and circumspection is requisite, to enter or go forth safely. These two havens have their names of villages seated on them, which are very small and no ways considerable.

SECT. VI.

Broad-haven, Achill Haven, and Galloway Haven.

The province of Connaught, extending herself betwixt Ulster and Munster, taketh up the greatest part of the west side of Ireland, it hath also some
good ports, as namely Broad-haven: another to the north of Achill head; and
a third, situated between the main, and the north and east side of Achill island,
in which one may ride in seven and eight sathoms, and be desended off all winds;
although it be rather a sound, than an inclosed harbour: for the ships which
are come into it, need not go forth the same way again, but sailing on betwixt
the main and the island, may at the south end of the isle come again to the open
sea. These havens are nothing samous, being very seldom resorted unto by any
great ships, except such as by tempests and soul weather, or some other accident, are necessitated to shelter themselves in the same.

But the famousest port of this province is that of Galloway, being a very great bay, some miles broad, and many more long, having in the mouth three islands, (named the isles of Aran) the which lye north and south by the side one of the other, there remaining three channels for to come out of the sea into this bay. One channel runneth betwixt the land and the northern island, called therefore north sound: the second between the same northern island and the middlemost; which channel, being the most usual of the three, is commonly stiled St. Gregory's sound: and the third between the southernmost island and the main, named south sound: the channel betwixt the southern and the middlemost island not being passable by reason of the sands and shelves, wherefore

the name of false sound hath been given to it.

The whole north fide of this bay is very foul with fands and rocks, so as one may not approach the shore in a great way: at the end of which sand, and in the innermost part of the bay, lieth a little island, called in English, Muttonisland, and by the Irish, Enis Kerrigh, which hath the same signification; at the east side whereof one may anchor in five or six sathoms of water; but from thence northwards until the city of Galloway, which is the space of two or three miles, none but little vessels and barks can go, the city standing not on the bay it self, but on a broad water like a river, the which not far above Galloway coming out of a great lake, called Lough Corbes, dischargeth it self into the bay a little above Mutton isle.

SECT. VII.

The Havens of Limerick, Smirwick, Dingle-bay, Ventry, and Dingle-Icoush.

THE next great haven on the west side of Ireland, to the south of Galloway, is that of Limerick, which haven divideth the province of Connaught from Munster, being of a huge length, no less than fifty miles: for so far it is from the mouth of the haven until the city of Limerick, to whose walls great vessels may go up, without meeting with any thing else in all that way, save a many little isles, but not any foul places, rocks, or sands. This harbour is nothing else but a great lough (half way its length growing somewhat narrow, but immediately inlarging it self again into a great breadth) whereinto the river Shannon, (upon whose bank Limerick is situated) dischargeth it self a little way below the said city; although the English and the Irish both call it the Shannon all the way until the sea, as it were not a lough into which the river falleth, but the river it self thus inlarged.

Coming out of this harbour, the land on the left hand shooteth a huge way westwards into the sea, on the side of which foreland, ten or twelve miles at this side of the uttermost point (betwixt which and the isle of Blasques passeth the sound of the same name) is the haven of Smirwick, not very great, deep,

but clean, and well inclosed.

At the other fide of this foreland, and to the northeast from the Blasques, is a fair and very large bay called Dingle-bay, the which goeth very many miles into the land, having in it divers good havens, one whereof, called Ventry, is four or five miles from the found of Blasques eastwards; and three or four miles further is Dingle-Icoush, before the mouth of which harbour, and at the west side of it, lieth a rock, called the Crow, round about which one may sail without danger, it being always above water, but at spring tides, at which time the sea doth overslow it.

SECT. VIII.

Maire, Bantry, and Beer-haven.

AGAINST the southeast corner of Dingle-bay lieth a great island, called Valentia, betwixt which and the main is a very fair and safe road. And a little way beyond that island goeth in another huge bay, called Maire, which shooteth into the land a great deal farther than Dingle-bay: and somewhat farther is a third bay, called Bantry, which equalleth Maire both in breadth and length; in both which, as well as in Dingle-bay, there be several good harbours and roads.

Maire hath in the mouth some fifty or five and forty fathoms of water; entring in further, there be six and twenty, twenty, and eighteen; afterwards you come to ten, and to six, and in the innermost parts to three and two fathoms; being throughout very clean, and free from all kind of rocks and sands,

except in very few places.

As you enter into Bantry, fideward upon the left hand lieth a reasonable big isse, called the island of Beer haven, betwixt which and the main there goeth in a fair found, being a great musket shot broad; the which in its whole length, from where it beginneth until the place where it endeth at the further part of the island, being the space of some miles, serveth for a very good and safe port, wherefore also it beareth the name of a haven, being called Beer haven. A good way within the mouth lye some rocks in the midst of the channel, the which at high water are overflown, and you may sail of either side of them: and at the other side of this sound, where the same cometh out into the Bantry, there lye two great rocks just in the mouth, betwixt which the ships may pass, as also betwixt the same and the land of either side. All the rest of this harbour or sound is everywhere very clean and clear, and very good anchor ground, ten, twelve, and thirteen fathoms deep.

SECT. IX.

Whiddy Haven and Langerf.

In the innermost of the Bantry lieth an island about three miles long, called Whiddy, betwixt which and the main is a very fair wide bay, (being the uttermostend of the great bay Bantry) where you may everywhere come to an anchor in three, four, five, or fix fathoms, in as much or as little water as you will, according as you have a mind to ride near the shore or further from it, being every where clean ground. Ships may enter into this bay or sound in two several places, at both ends of the island. But the entrance at the south end is very dangerous, because that there betwixt the island Whiddy and the main land it is in most places foul and rocky: but in the other entrance, at the northern end of the island, is both room and depth enough, it being much broader than that at the south end, and eight and nine sathoms deep; and there is nothing that can do hurt, except only a row of rocks a little musket shot from the shore, the which being covered at high water, do not begin to appear but at halfebb.

Right against this island, at the other side of Bantry, is a haven called Langers, in which is every where good anchoring and good ground; only at the one side, on the right hand close to the mouth, lye some soul grounds, the

which fall dry at the ebb of a spring tide.

From Beer haven to the northern corner of the island Whiddy, the Bantry tendeth east north east and north east, eighteen or twenty miles in length. Over against Beer haven, in the midst of the fair water, it is deep forty, six and thirty, and thirty fathoms; beyond the island sisteen and sixteen; but further

in, approaching the isle of Whiddy, it is again twenty and five and twenty fathoms deep.

SECT. X.

Downams Bay, Baltimore Bay, and Baltimore Haven.

NEXT to the Bantry, and only by a narrow neck of land divided from it, is Downams bay, being great and wide (although no ways comparable to any of those three already described) a very commodious road to save ships in, and good anchor ground every where.

The land to the east of this bay shooteth out very far to the seaward; the uttermost point thereof, called Messan-head, being the southermost cape of all Ireland. For Cape de Clare, being about twenty miles surther to the east, and

fomewhat more foutherly, is not on the main, but in an island.

Beyond Messan-head is another bay, far greater than any of those three forenamed, but nothing like the same in shape, nor in the same manner running with a long arm a huge way into the land, but rather approaching to the figure of a half moon. In this bay is Crook haven, School haven, and several other great havens, not only on the main land, but also in some of the islands, where-of there is a great number in this bay. The most easterly of all these islands is Baltimore, the which surpassing all the others in bigness, giveth its name unto the bay.

That part of the bay which lieth betwixt this island and the main, having a narrow entrance, but within of a great largeness, is a marvellous good road, where ships may come to an anchor on either side, and lye defended off all winds. It is sive and six sathoms deep on the sides, and six and seven in the midst. In the mouth of the harbour, next to the east side, lieth a blind rock; and in the midst of it another rock, which appeareth at low water. There is nothing else that can do hurt. This haven, being far the principallest of all this bay, hath its name, as well as the bay it self, of the island, being called Baltimore haven. To the north of that island lieth another island, called Spain island, where one may pass betwixt these two islands to the west, and so out of Baltitimore haven go into the sea. But only with smaller vessels, because half flood there is not above twelve or thirteen seet of water in all that channel.

SECT. XI,

Castle Haven, Rosse Haven, Clandore Haven, with the Havens of Kinsale and Cork.

Some miles beyond Baltimore bay is Castle haven, where ships may come to an anchor in twelve sathoms of water, being of a reasonable bigness, and very clear and clean, as well in the entrance as within.

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Between Castle haven and Kinsale are two other good havens, to wit that of Rosse, and of Clandore, in which there is water enough, and very clean ground.

The haven of Kinsale is one of the samoutest of all Ireland; ships may sail into it, keeping in the midst of the channel, without any danger either without or in the mouth of the harbour, except a blind rock close to the east point. Within the haven, on the west side, lieth a great shelf, which shooteth a great way off from the land, but leaving a very large passage along by the side of it, in which, as in all the rest of the harbour, it is many sathoms deep. This haven for some miles goeth in NNE, but afterwards turneth westward until the key of Kinsale, where ships may ride in eight or nine sathoms of water, being defended off all winds.

Ten or twelve miles to the east of Kinsale is Cork haven, the which goeth in NNE, being within large and wide, running a great way into the land: for the town of Cork, until whose key this haven is very clean and deep, is

feated many miles from the sea, and from the mouth of the harbour.

CHAP. III.

Of the lesser Havens, and the barred Havens of Ireland, also of the Roads and Anchor-places upon the Coast, and in the little Islands near the Coast.

SECT. I.

Wexford Haven.

FTER the description of the principal havens of Ireland, we shall come to them of less moment, in which number we put all those, which either in their entrance, or within, have not water enough for the bigger fort of vessels; as likewise those, the which being deep enough, are but very little, and of a small pourprise; and in this description we shall observe the same order as in the former, beginning with Wexford, and so going northward, then west, afterwards southward, and lastly east and north eastward, until we have gone about the whole island.

The haven of Wexford runneth in west and by north, and with her innermost part altogether northward. Just before this haven lye two great shelves of sands by the side one of the other, of which that on the south side is called Haneman's path, and the other north grounds. There goeth a channel betwixt Haneman's path and the land on the south side of the haven, and another betwixt the north side and the north grounds; but this last hath but six

feet

feet of water at full flood, and in the other eight feet with the flood of ordinary tides, and ten at spring tides. The chief channel is that which goeth in betwixt the two sands, being four and five fathom deep. Besides these sands there is another shelf in the mouth of the harbour it self; which kind of sandy banks lying across in the mouth of harbours and rivers, are usually called Bars; and the havens which have them, barred havens. With a high flood there is about sixteen feet of water. Being past the bar, you have for some way three sathoms of water, three and a half, and four; but afterwards for a great way but ten feet, and ten and a half, with a high flood; although under the castle where the ships come to an anchor, you have four fathoms, and before the town three; but because of the forementioned shallows, no vessels can go to Wexford, that draw more than ten feet of water, but must unlade and lade in a creek near the mouth of the haven on the south side, about three miles from the town, where is water enough, but no shelter for the south west winds, the which do come over the land to this place.

SECT. II.

Dublin Haven.

DUBLIN haven hath a bar in the mouth, upon which at high flood and spring tide there is fifteen and eighteen feet of water, but at the ebbe and nep tide but fix. With an ordinary tide you cannot go to the key of Dublin with a ship that draws five feet of water, but with a spring tide you may go up with ships that draw seven and eight feet. Those that go deeper cannot go nearer Dublinthan the Rings-end, a place three miles distant from the bar, and one from Dublin. This haven almost all over falleth dry with the ebbe, as well below Rings-end as above it, so as you may go dry foot round about the ships which lye at an anchor there, except in two places, one at the north fide, half way betwixt Dublin and the bar, and the other at the fouth side not far from it. In these two little creeks (whereof the one is called the pool of Clantart, and the other Poolbeg) it never falleth dry, but the ships which ride at an anchor remain ever afloat; because at low water you have nine or ten feet of water there. This haven, besides its shallowness, hath yet another great incommodity, that the ships have hardly any shelter there for any winds, not only such as come out of the sea, but also those which come off from the land, especially out of the southwest; so as with a great south west storm the ships run great hazards to be carried away from their anchors, and driven into the sea; which more than once hath come to pass, and particularly in the beginning of November, An. 1637, when in one night ten or twelve barks had that misfortune befaln them, of the most part whereof never no news hath been heard since.

SECT. III.

The Havens of Drogheda and Dundalk.

The haven of Drogheda, or, as the word is pronounced in common use, Tredagh, is very troublesom to be got into, as having not only a bar lying across before its mouth, over the which vessels cannot pass but at high water, but also very narrow in the mouth: this haven not being an arm or bay of the sea, but only a river which keepeth her own bigness until the end, without receiving any notable enlargement of the sea about her mouth, as other rivers use to do. Upon this bar is as much water as upon that of Dublin; and the ships which can pass the bar, may go up to the key of Tredagh; which town is seated about two miles from the mouth of this river, which is called the Boyn.

Sixteen miles to the north of Tredagh standeth Dundalk, where a wide open bay (made by the giving back and retiring of the coast) growing narrow, and receiving a little river, which above Dundalk is but a small brook, maketh a kind of haven, where never is much water, and with the ebb may be passed over a-foot; wherefore, and because there is not any shelter for the winds coming from the sea, nor any usual traffick, this road is very little frequented.

SECT. IV.

The Havens of Dundrum, Ardglass, Oldsleet, Belletree, and the Bann.

A FEW miles on this fide of Strangford, are the havens of Dundrum and Ardglass, the one not far from the other, both little, and not very deep, but safe: and a little way beyond the northern point of the bay of Knocksergus, is Oldsleet haven, a harbour of the same fort as those two last mentioned.

Port Belletree, six or seven miles to the west of Fair-foreland (the north-ea-sterliest point of Ireland) is as little as any of those three, less detended of the

winds, and the ground sharp and foul.

Some miles further is the haven of Colrain, called Bann haven, the which is nothing else but the mouth of the river Bann, the which here falleth into the sea, keeping her own narrowness until the end, in the same manner as we said above of the haven of Tredagh. This river passing through Lough Neagh, the greatest lake of all Ireland (the which receiving several rivers, hath no other outlet into the sea but the Bann) carrieth a mighty deal of water, the which being inclosed in a narrow channel, poureth it self into the sea with great violence: for which reason, and because of the narrowness of the mouth, this haven is very hard to enter, having also but little depth, so as vessels which draw eight seet of water, must at least have three quarters of the flood before they can enter.

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SECT. V.

Telling Haven, Mackswin's Bay, the Havens of Ballyshannon, Slego, Endrigo, Moy, and Niffadoy.

UPON the west coast of Ulster, about half way between Cape Telling and Kilbeg, is Telling haven, a round bay, with a good sand ground, which will contain about thirty ships: west and southwest winds blow directly into it, but off all other winds one is there defended.

Two or three miles eastwards from Kilbeg is Mackswin's bay, where a ship may ride safe without cable and anchor: but the entrance being every where

beset with rocks, it is dangerous to go into it.

Some miles to the fouthwest of Dunnagal haven, is Ballyshannon, being the mouth of that short river, by which Lough Earn, one of the greatest Lakes of Ireland, dischargeth it self into the sea; which river runneth just on the borders of the two provinces of Ulster and Connaught, dividing the same; this having a bar before it, by reason whereof no bigger vessels than of thirty or forty tunns can enter into it.

Slego and Endrigo are two little harbours, situated near the one to the other, in the north part of Connaught, very much encumbred with rocks and sands in the entrance, but otherwise reasonably deep; for a ship of two hundred tunns

may come and ride before the town of Slego.

About half way between the town of Slego and Broad-haven is Moy, being the innermost of a great bay, divided from the rest by a little island somewhat long, the which lieth cross in that manner, that only one channel remaineth, whereby to go out of the great bay into the lesser, or the haven, which channel is twelve foot deep; but in the haven it self, being nothing else but two little creeks, divided as under by some sands lying betwixt them, it is about sisteen or sixteen foot deep; but in the little channel which passeth into the inmost creek, being nearest to the village Moy, there is but nine foot of water at full flood with an ordinary tide.

Some miles to the southeast of Slime head, (a famous cape in Connaught, and situated about half way the length of that province) is port Niffadoy, a reasonable good harbour, but very dangerous to get into, the sea there round abouts

being full of rocks both blind ones and others.

SECT. VI.

The Havens of Tralee, Youghal, and Dungarvan: item of Wicklow, Arklow, Malahide, &c.

AT Tralee, half way between Smerwick and the mouth of the haven of Limerick, is a fair haven but none of the biggest.

About the middle way between Cork and Waterford is the haven of Youg-

Twelve miles eastwards from Youghall, is Dungarvan, being a narrow tidehaven, whose mouth is full of rocks, many of which do not appear, and so more dangerous, and at low water it falleth dry, so as one must go into it at

high flood, and pass amidst the rocks.

As for the havens of Arklow (where with high water it is but fix feet deep) of Wicklow (where at full flood you have but ten feet of water) Malahide, a little to the north of the bay of Dublin; Coledagh haven, and Red haven, the first betwixt Lough Foyle and Lough Swilly, and the other betwixt Lough Swilly and Sheeps haven; Milk haven, not far from Slego; Mablin haven, betwixt Waterford and Wexford; and some others of the same nature: they are so little, that they will hardly serve for other than fisher boats, and therefore scarce merit the name of havens.

SECT. VII.

Roads upon the Coast of Ireland, from Waterford to Fair-foreland.

Besides this great number of havens in Ireland, there are many good roads, where ships at need may save themselves, and commodiously come to an anchor, not only upon the coast of the main land, but also in the most part of

the little islands, which lye round about Ireland.

To begin with those on the main. From the point of Waterford to Carnefore, being the space of about twenty miles, the coast is sull of bays, where one may come to an anchor. Under Carnesore ships anchor in six and nine fathoms. In St. Margaret's bay, three miles from Carnesore it is good anchoring in five and six sathoms, sand ground. A little further is the bay of Greenore, where you may anchor as near the land as you will, in six, sive, sour, or three fathoms.

Some miles from Wexford to the point of Glascarick, from which place to the bay of Dublin, being about fifty miles, the coast is full of inlets, where it is very good anchoring, in good sand ground, especially to the north of Arklow head (in a fair sand bay everywhere in eight, seven, or sive sathoms) and between Arklow and Missen head, being the space of six or seven miles.

In the mouth of the bay of Dublin, at this fide of the bar, is good anchoring, as well on the fouth fide, before the village Dalkee (which place is known by the name of Berton road) as on the north fide, round about that great cape,

named the head of Hoath.

Between Strangford haven and the bay of Knockfergus are divers good anchoring places; but all that coast is very foul with rocks, and blind rocks. To the north of Knockfergus are divers inlets, where one may come to an anchor; there are some rocks, but they all stand above the water, so as easily they they may be shunned.

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SECT. VIII.

The rest of the Roads upon the Coast of Ireland.

To the west of Fair-foreland the coast is flat and clean, so as there ships may anchor every where in eight and nine sathoms. Under the point of Eniston on the west side one may anchor for easterly winds, or to stop the tide.

Between Lough Swilly and Sheep haven is an inlet where ships may come to

an anchor; but the ground is somewhat foul.

On the west side of cape Horn ships may ride at anchor for easterly winds: and along the whole coast between cape Horn and the isles of Aran is every where good anchor-ground; as also upon the west coast between St. John's point and Dunnagal haven, being the space of sive or six miles.

In the found of Blasques it is good anchoring on the fouth fide of the point

for northern and western, and on the north side for the contrary winds.

On both sides of the old head of Kinsale, by the Dutch mariners called cape

Velho, ships may anchor as deep or shallow as they will.

There is also a good inlet for to anchor in a few miles beyond the haven of Cork; and on the east side of Ardimore head is a bay, where it is good riding for westerly winds in seven or eight fathoms.

There is also a good anchoring place or two betwixt Dungarvan and the ha-

ven of Waterford.

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SECT. IX.

Roads in the Islands of Saltees, Dalkee, Ireland's Eye, and Lambay.

As for the roads in the islands; about half way betwixt Waterford haven and Carnesore lie two little islands, a mile or two from the land, call'd Saltees: the southmost whereof, which lieth furthest from the land, is much bigger than the other: ships may pass between these two islands in five, six, and seven fathoms. On the east side of the lesser island is a good road to come to an anchor in seven or eight fathoms, where ships may ride in satety for south west, west, and north west winds: and on the north west side of the bigger island ships may anchor in seven, eight, or nine sathoms, the road being defended off south south east, and east south east winds. Close by the south point of Dublin bay lieth a small island, called Dalkee, betwixt which and the main land passeth a sound seven, eight, and nine sathoms deep, in which you may anchor under the island. On the north side of the head of Hoath lyeth another small island, scarce half a mile in compass (wherein, as also in Dalkee, no body inhabiteth, both serving only for to feed cattle) having a decayed chappel on the west side, over against which ships may come to an anchor.

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Three or four miles beyond Ireland's Eye lieth the isle of Lambay, belonging to sir William Usher of Dublin, who hath there a fine little castle of free stone, and close by it a village, wherein dwell divers families, of sishers and husbandmen, who plow part of this island, and upon the rest feed cattle and sheep. The whole island, being about three miles in compass, is high land, wherefore it may be seen a great way off. On the north side of this island ships may anchor in twelve and thirteen sathoms for a southerly wind. For a sea-wind the ships must ride on the west side, over against the castle: but that road is not very good, because always in that sound, being about three miles broad, goeth a great sea.

SECT. X.

Roads in the rest of the little Islands about Ireland.

RIGHT against the promontory of Fair-foreland lieth the island Raghlin, where ships may sail round about, as well at the outside, as betwixt it and the land, according as the wind and tide serve. On the south west side is a fair bay with very fine sand ground, where ships may ride desended off all winds. A little way on this side and to the east of Bann haven lieth Skires Portrush, a rocky island, the which on the south side hath a fair bay, very good sand ground, where ships may anchor in six or seven fathoms, being sheltred off all winds, except the east north east wind, the which along the coast doth directly blow upon it.

There is a good road on the fouth east side of the isle of Aran, situated on the north west side of Ireland: and betwixt this island and the main there lye three or four small isles, where ships may anchor in divers places, and be secu-

red off all winds.

There is also a good road for some winds under Eneskie island; the middle-most of the three islands situated betwixt Achill head and Slime head, called Boche, where is good anchoring in four fathoms; under the northernmost island of those three lying in the mouth of the bay of Galloway; under Ennis Morrow, one of the Blasques; under Dorses island, lying betwixt the bays of Maire and Bantry, in the sound which passeth betwixt the same isle and the main land.

Ten or twelve miles to the east of Cork haven lieth an island called Bally-cotton, where ships may anchor in five or six fathoms for westerly and southerly winds. There is also a good road on the east side of Capel island, a little isle, lying three or four miles from the mouth of the haven of Youghall.

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CHAP. IV.

Quality and Fashion of the Irish Coast or Shores, Item, A brief Description of the principal Promontories or Heads of Ireland.

SECT. I.

Of the low and strandy Shores of Ireland.

He Irish coast is not every where alike; but of several sorts: in some places the land along the sea is low and flat, having a broad sandy strand, with a row of sandy hills, the which doth part the land from the strand, in the same manner as it is upon all the coast of Holland and Flanders (where these kind of hills are called Duynen or Downs) only with this disference, that they are not so large nor high, as in the Low-Countries, and that the rows of them take up but a little space in breadth. This kind of strand is in most parts of Fingall (being a portion of the county of Dublin northwards towards Tredagh, and a good way beyond that, and elsewhere. In other places lye no downs or sandy hills, nor any other heights, betwixt the strand and the land, it being only defended from the overslowing of the sea by an unsensible rising.

SECT. II.

Of the high and hilly Shores of Ireland.

In other places the land is high and hilly on the sea side; part whereof doth descend by degrees towards the sea, having a strand below; but elsewhere the land is high and steep, being washed underneath by the deep sea, so as ships of great burthen may sail close by it; the which may be observed not only in the heads or capes, the most part whereof are thus fashioned, but in many other places, and in great extents of the coast. For as concerning the saying of Giraldus, that Ireland every where upon the coast is very low, Est per omnia sui latera marinaque littoraterra valde demissa, that is evidently repugnant to the truth. Some of these high shores are bare naked rocks, covered with very little or no earth, so as scarce any thing groweth upon them but dry grass and heath; others are stony within, but have at the top a reasonable deep mould, and all over cloathed with good grass; some of them being so exceeding steep towards the sea side, that it is impossible for man or beast, being

being come to the further end, to go one step further, without falling down and being lost. So as it hath happened, that cattle and sheep feeding in those places, when they were come to the top, and following the grass, suddenly tumbled down, falling headlong into the sea, or upon the hard sharp rocks standing at the bottom.

SECT. III.

Capes on the east side of Ireland.

THE heads or capes of Ireland are in great number, and many of them very observable, to the great commodity of the sea-taring men. In the south easter-liest point of Ireland is the cape of Greenore, five or six miles to the south of the bay of Wexford, being not very high, but steep, and flat at the top: and

three or four miles to the fouth west from it is the point of Carnesore.

Betwixt Wexford and Dublin there be five heads: that of Glascarick, which the Dutch mariners call the Blew point, and the Steep point, twelve miles to the north of the bay of Wexford, being of no great height. That of Glaskermen or Arklow being well near at the same distance from the head of Glascarick, as that is from the bar of Wexford. Missen head, some nine or ten miles further to the north. The head of Wicklow, six miles beyond Missen head, being steep and rocky, divided at the top into two little hillocks. And the fifth and last of all, that of Bray, about sisteen miles beyond Wicklow, and five or six miles to the south of the bay of Dublin, being a great and high cape, shooting a good way into the sea, and so steep, that it is ten fathoms deep there close under the land.

On the north fide of Dublin bay is the head of Hoath, a great high mountain, three or four miles compass in the botom; having the sea on all sides, except the west side, where with a long narrow neck it is joined to the land; which neck being low ground, one may from either side see the sea over it, so that afar off it seemeth as if it were an island. This head may be seen a great way off at sea; for even upon the land one may very pertectly see it, not only upon the key of Dublin which is six miles from thence, but nine or ten miles

further westward.

Upon all the coast from the head of Hoath to Dundrum, being about the space of 60 miles, is none considerable. But some miles beyond Dundrum, and three or four miles at this side the haven of Ardglass, is St. John's point, a head and foreland which shooteth a good way into the sea.

The next head beyond St. John's, is the point at the north fide of the haven of Strangford, which the Dutch mariners by a notable mistake call the point

of Ardglass.

All these capes lye on the east side of Ireland, whose utmost point northward is the promontory of Fair-foreland.

SECT. IV.

Capes on the north side of Ireland.

ABOUT fifty miles to the west of Fair-foreland, and well near the middle of the north coast, is the head of Eniston, which with the land next adjoyning lieth much more northward, and runneth further out into the sea than any other land upon this coast, being of a great height, so as it may easily be known by any that once have seen it.

Some forty miles more westward beyond this promontory lieth the cape which is known by the name of Horn head, being a hill with two hommocks at the top, in sashion somewhat like unto two horns, from whence it hath received

its denomination.

SECT. V.

Capes on the west side of Ireland.

Upon the west side of the Irish coast are four principal heads, viz. Telling head, lying about thirty miles to the south west of the lises of Aran, the which are situated over against the north westerliest point of Ireland. Achil head, some miles to the south of Broad-haven, being not on the main, but in an island. Slime head, which by the sea-faring men is called Twelve-pence, because the land sheweth it self in twelve round hommocks, being situated well near in the middle of the west coast: and Lupis head, which is the northern point of the haven of Limerick.

As for the other heads upon the same west side, namely those three betwixt the haven of Slego and Broad-haven, by the Irish pilots called Can Moyn, Can Killala, and Can Jores, (Can in Irish betokeneth a head in all forts of signistications) Renilira and Clegin, between Achil head, and Slime head (which last the Irish call Can Leme) Brain and Calew, situated to the south of the bay of Galloway; and Can Sanan, being the south point of the bay of Limerick; those

are less considerable.

SECT. VI.

Heads on the fouthern coasts of Ireland.

Upon the fouth west side of Ireland, the principal heads are cape Dorses (situated in an island of the same name, betwixt the two great bays of Maire and Bantry) and Missen head, situated betwixt the bays of Bantry and Baltimore; being the same, in Camden's opinion, which Ptolomy calleth Notium, that is southern, it being the most southerly point of all Ireland.

Upon

Upon the fouth east side is the head of Clare, standing in an island on the east side of the bay of Baltimore; and a great way from thence, the old head of Kinsale, called cape Velho by the Dutch mariners; which head, to those that come failing along the land afar off, seemeth to be an island, being a point which shooteth a great way into the sea, whose utmost, or most southerly end is very high and steep.

Upon the same side standeth the head of Ardmore, which runneth a great way into the sea from the land on both sides, and because of its height may be

feen many miles off.

CHAP. V.

Of the Sands or Grounds, blind Rocks, and other Rocks in the Irish

SECT. I.

Of the Grounds before the Coast betwixt Dublin and Wexford.

HE fea which invironeth Ireland, is as free from shelves, sands, or grounds, as any in all the world, not alone upon the other fides, where the fame is wide and open, far diftant from all other lands, but upon the cast side where the same is inclosed betwixt Ireland and Great Britain, in which whole space it hath not any other fands than those situated along the coast between Dublin and Wexford. These indeed are of a huge extent, but not turning and winding as most part of the grounds in other places, but in a streight line, NNE, and SSW, being farthest from land with their north end; and as they go fouthward, to they do come nearer to the land; and near the Tuskard, a rock right against the point of Greenore, in which place they end, they are not much more than two miles distant from the land; whereas the distance betwixt the north end, near the island Dalkee (which island, as before we have shewed, lieth at the entrance of Dublin bay, about threescore miles from the Tuskard) is above eight miles. They are all of a ftony ground, in lome places but one fathom deep, and a fathom and a half; but in the north end two fathoms and a half, and three fathoms.

Betwixt these grounds and the land lye two or three little sands, besides those which lye in, and before the mouth of the bay of Wexford: one betwixt the south end and Greenore; another to the south of the head of Glascarick, a good mile from the land, called Ross and Ram; and a third one mile to the south of Arklow head, called Glaskermen, somewhat more than half a mile

from the land, and about two miles long.

SECT.

Of the Channel betwixt the Land and the forenamed Grounds.

SECT. II.

The channel betwixt the great grounds and the land is very deep all over, fo that the biggest vessels may pass through it from Dublin to Wexford, and from Wexford to Dublin, taking care only that they do not come too near the grounds, the which being very steep on the inside (as they are also without, or on the east side, where ships may not come nearer to them than in twenty four and twenty five fathoms, because that in twenty fathoms one is close by them) it is requisite not to go further off from the land, than in seven or eight sathoms, in which depth ships may within a cable's length sail all along the coast, the which here everywhere is very clean, and free from all danger. And even between the land and the forenamed small grounds, Glaskermen and Ross and Ram, the sea is very clean and deep, so as most ships do pass betwixt them and the land, and not about by the outside of them.

These sands in sour several places are cut thorough with fair, broad and deep channels, whereof the one is over against the bay of Wexford; the other against Glascarick, being no less than sisteen or sixteen fathoms deep; the third right against Arklow, in which channel it is about seven or eight fathoms deep; and

the fourth is directly against Wicklow.

Chap. V.

SECT. III.

Blind Rocks upon the Coast of Ireland from the Saltees unto Wicklow.

THERE are some blind rocks in this sea, but lye for the most part close under the land, or near some of the little islands or high rocks, so as they may easily be shunned, the rather, because most of them do at low water appear either in part or altogether. To speak a little of these in order: the Saltees, two little islands situated half way between the haven of Waterford and the head of Carnefore (of the which hath been spoken heretofore) have both at the north 11de iome blind rocks; whereof those which lye near the bigger and southermost island, fall dry at low water. About three miles to the south of the same bigger island lieth a blind rock called Kingmore, of the bigness of a ship, at half ebb it cometh above water, and is so steep, that with the side of a ship one may lye close against it, and have fourteen fathoms of water, so as without any danger one may fail very close by it. To the fourtheast of the forenamed bigger island doth also lye some blind rocks, called the Furlas, the which may be seen at low water, and ships may pass thro' the midst of them. About half a mile from blackrock (a noted rock whereof shall be spoken anon) lieth a blind rock, called the Barrel, of the which one must take heed very carefully.

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A little to the west of Carnesore lieth a small rocky foul, close under the land. Betwixt Carnesore and St. Margaret's bay it is foul and rocky, but the foul grounds do not reach far into the sea.

SSE from St. Margaret's bay lieth a blind rock, called Caliogh, the which at low water falleth dry. From the point of Greenore a riffe of blind rocks and stones runneth almost the length of a mile into the sea, the which at low water falleth dry a good way from the land. At the north side of the head of Arklow lieth a little stony row, the which is shunned very carefully by the ships, not daring to come nearer to it than in five fathoms of water.

SECT. IV.

The rest of the blind Rocks upon the Coast of Ireland.

Just to the fouth of the head of Wicklow, a little way from the land, leth a rocky fand called Horse shoe; betwixt which and the land ships may sall thorough, if need be: but that being full of danger, it is done very seldom; and a little further to the south lieth a little blind rock close by the land, called the Wolf, the which at half ebb cometh above water; betwixt which and

the land fishers boats do pass.

The like blind rocks and rocky fands lye upon the coast betwixt Tredagh and Dundalk, as also betwixt Dundalk and Carlingford, in both places close under the land: at both the points of the havens of Carlingford and Strangford under John's point, fituated half way between those two havens: on both sides of those two great rocks, a little way beyond Strangford haven, called Southrock and Northrock: between the islands of Copland isles and the land, at the fouth points the bay of Knockfergus: round about those great rocks over against Oldsleet, ca led the Nine Maids: to the west of the little island called Sheeps island: between port Belletree and Skires Portrush, which rocks are called the Chickens: half w betwixt Lough Swilly and Sheep haven, a mile or two from the land, which rocks the flood doth cover, but at ebb they come above water; and in fever other places upon the west coast and the south coast the which it would be a dious all to particularize: wherefore we will conclude this rehearfal of the blir rocks with that which to the west of St. John's point (a point situated the or four miles fouthward from Kilbeg haven) doth lye fomewhat more than mile off from the land, upon which the fea breaketh with great noise, and a vertheless one may freely and without any danger fail between the same a the land.

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SECT. V.

Rocks in the Irish Sea, upon the east side and the north Side of the Coast.

THERE be also divers rocks that always stand above water, the which as they are dangerous in the dark night, and in misty weather, so at other times they are rather profitable than hurtful, forasmuch as they serve the sea-faring men for sea marks, and help them to discern the situation and distances of the coasts; wherefore also the most part of them have received peculiar and proper names. The principal of this whole number is the Tuskard, a great black smooth rock, of sashion like unto a ship turned the upside downwards, but as big again, lying south eastwards from the point of Greenore the space of three miles. To the southwest of the Tuskard a great way, and about a mile and a half from the bigger of the Saltees, is the rock Kingbeg. To the north east of the Saltees stand two rocks not far the one from the other, of which the one of its situation is called Northrock, and the southermost the Tuns. To the east of these two, and about three miles from the point of Carnesore, lieth Blackrock, being clean of all sides, so as ships may freely sail round about it without any fear or danger.

A mile or two to the north of Lambay lieth a great rock called rock Abill,

about which ships may sail of all sides.

Two miles beyond the north point of the haven of Strangford are two great rocks, the one called Northrock, and the other, distant two miles from it to the fouth, Southrock: the Northrock is a number of rocks lying close together, divers whereof are covered at high water. From the end of these two shoot out riffs of toul and rocky ground; but betwixt them goeth a broad, clean, and deep channel, through which all manner of ships, even the biggest, may pass.

Six or seven miles to the north of the bay of Knocksergus, and three miles from the land, are the Nine Maids, being great rocks that lye but a little above the water, or low rocky isles, with a great number of blind rocks about the same, so as ships may come no nearer to them than within five or six miles.

Of the same kind of low rocks, or little rocky islands, are also those who are called Enesterhull islands, being situated before the most northerly point of Ireland, betwixt Lough Foyle and Lough Swilly.

SECT. VI.

Rocks in the Irish Sea upon the western and the southern Coast.

NEAR the islands of Aran upon the north west coast of Ireland, lye several high rocks, called the Stags of Aran; and such other rocks, called the Stags of Broad haven, lye three or four miles from the northern point of Broad haven.

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Three miles to the north west of Achil head lieth Blackrock, a great, high

and black rock, with several other rocks near unto it.

On the north fide and west fide of the islands Blasques, lying over against the most westerly point of Ireland, are several great rocks, some whereof are called the Horses, and others the Bucks.

Seven or eight leagues to the fouth of Blasques lye three great rocks, called the Skellighs, the easterliest about three miles, and the westerliest six or seven miles from the land; the which, to those that come from the south, when first

they begin to see them, resemble the sails of ships.

Without the head of Dorses lye three other great rocks, whereof the uttermost, or the most westerly, is called the Bull, the middlemost the Cow, and the third the Calf, being clean round about, so as without any danger one may fail between them.

Five or fix miles west and by south of the head of Clare lieth a high steep rock alone in the sea, called Fastney, the which at the first appearing looketh

like the fail of a ship.

Two or three miles to the east of Baltimore, and a mile or two from the land, lye five or fix high steep rocks called the Stags, as those of Aran and Broad haven, to those that come from the east along the land, when first they begin to have them in fight, they resemble some spires or pointed steeples standing together.

Two miles eastwards from the mouth of the haven of Kinfale, lye two great

black rocks, the one somewhat farther from the land than the other.

There lye also several rocks near the little islands of Dalkee and Ireland's-eye, the one situated before the north point, and the other before the south point of the bay of Dublin, as heretofore we have shewed. Likewise on both ends of the isle of Lambay, half way betwixt the same island and Tredagh haven, close by the land; near the island Raghlin, near Skires Portrush, and inseveral other places, but the principal and most considerable are those whereof we have spoken.

CHAP. VI.

Of the Nature of the Irish Sea, and of the Tides which go in it.

SECT. I.

The Irish Sea not so tempestuous as it it is bruited to be.

HAT part of the Irish sea which divideth Ireland from Great Britain, is very much defamed both by ancient and modern writers, in regard of its boysterousness and tempessuousness, as if it were more subject to storms and raging weather than any other, and consequently not to be passed without

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without very great danger: Mare quod Hiberniam & Britanniam interluit, undosum inquietumque, toto in anno non nisi paucis diebus est navigabile: That is, The sea which passeth betwixt Ireland and Britain, is toysterous and restless, so as but few days in the year ships can go upon it; saith Solinus: with whom Giraldus (who feveral times went to and fro betwixt England and Ireland) fully agreeth, writing in this manner, Hibernicum mare concurrentibus fluctibus undosissimum, fere semper est inquietum, ita ut vix etiam æstivo tempore paucis diebus se navigantibus tranquillum probeat: That is, The Irish sea being very boisterous through the concourse of the waves, is almost always restless, so as even in the summer time it is hardly for a few days quiet enough to be sailed upon. Likewise also Camden and Speed give unto this sea the surnames of boysterous and tempestuous. Yea it is a common proverb in England, As unquiet as the Irish sea. Nevertheless it is nothing so bad as they make it; and the words of Stanyburst, in his annotations upon Giraldus, Mare Hibernicum satis tranquillum est, nis ventorum vi agitetur, & non solum æstate, sed etiam summa byeme vectores ultro citroque navigant: The Irish sea is quiet enough, except when by high winds it is stirred, so as not only in the summer, but even in the midst of winter people do pass it to and fro, are altogether true, and confirmed by daily experience. True it is that some ships do perish upon this, but the same happeneth also upon other seas, who are all subject to the disaster of tempests and shipwracks.

SECT. II.

Causes of the Loss of such Ships as perish upon this Sea.

The common cause of the casting away of ships upon this sea, and upon the east coast of Ireland, is this, that in the long dark winter nights (when this disaster is more frequent than at other times of the year) some surious storm arising, the ships are dash'd against the rocks, against the rocky shores, or against those grounds which extend themselves betwixt the Tuskard and the bay of Dublin, whilst the steermen and pilots by reason of the darkness not being able to discern the land, or any of their wonted marks, do not know which way to steer to shun those dangerous places, and to keep themselves in the open sea.

SECT. III.

Nature of the Ground of the Irish Sea.

THE ground of the Irish sea, as well in the midst, as under the land, is almost every where clear sand; but in some places black and muddy or oozy earth: in very sew places rough and sharp; and scarce any where else but in the bay of Wicklow, so hard and stifly compacted, that the anchors can take no hold of it.

SECT.

SECT. IV.

Of the Tides in the Irish Sea.

What concerneth the ebbing and flowing in this sea, which invironeth Ireland: upon all the west side it floweth against the land, and the ebb falleth back from it into the sea; the flood from, and the ebb towards the west; for which reason very great tides, as well of ebb as flood go upon all this coast, not only the open shores, but in the bays and inlets (even those which go a great way into the land, as the haven of Limerick) so as those, who have been at Galloway, do assure us, that it doth so mightily ebb and flow there, that at high water great vessels may sail over those rocks, the which with the ebb come above water.

Upon the other side of Ireland it ebbeth and floweth along the land; for upon the north side of Ireland the ebb and flood salleth in the same manner as upon the west side, flowing from, and ebbing towards the west. But upon the east side, from Fair-foreland unto Carlingsord, the flood cometh from, and the ebb salleth to the north: as upon the rest of this east side, to wit, from Carlingsord to Carnesore, it floweth from the south, and ebbeth from the north. For although upon all this side the flood runneth along the land, yet doth it not take its beginning from one and the same, but two contrary points; the which two floods coming the one out of the main sea in the north, and the other out of the main sea in the south, do meet and stop one another before the haven of Carlingsord.

From Tuskard and Carnesore as far as to the head of Clare, being the whole southeast coast of Munster, the flood salleth along the coast ENE, and the ebb WSW. But upon the rest of the coast of Munster, beyond the head of Clare westward, which coast lieth W and by S, the flood salleth eastward, and the

ebb to the west.

SECT. V.

Strong Tides in the Sounds. Srange Property of the Bay of Wexford in the matter of Tides.

THAT which the sea-faring men do witness, that in the sound of Blasques, of Dalkee, and in that of Lambay, as also in some other narrow channels of this sea, there goeth a very strong tide, as well of the ebb as flood, is no other than may be observed almost every where else in places of the like nature.

But it is much to be wondred, what the same do relate of the channel or entrance of the haven of Wexford, to wit, that it ebbeth and floweth there three hours sooner than without in the open sea; so as when it is high water in the channel

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channel of that haven, and upon the bar of the same, the flood doth still for half a tide, or three hours after, strongly run by it to the north; whereby it cometh to pass that the end of Haneman's path (a great sand lying just before the haven of Wexford) is cast up more and more to the north; and that the channel which passeth by the north side of that sand, being the entrance of the haven, is now more to the north than it hath been formerly. And as it floweth three hours longer in the open sea than upon the bar and in the channel of this haven, in the like manner also, the ebb in the sea falleth to the south three hours after that it is low water in the same place, but not so strongly as the flood.

SECT. VI.

Some other strange Particulars about the Tides in the Irish Sea, related by Giraldus, but found not to be true.

MORE strange it is what Giraldus writeth of the havens of Wicklow and Arklow, to wit, that in Wicklow haven it ever floweth, when in the fea it ebbeth; and that it ebbeth there when it floweth in the sea. And that in the fame river (this haven being nothing else but the mouth of a little river) the water is falt as well when the ebb is at the lowest, as at the flowing and high water: and that to the contrary in that rivulet, which at Arklow dischargeth it self into the sea, the water keepeth its sweetness at all times (never receiving the mixture of any faltness) as well with the flood and high water, as with the ebb. But experience sheweth these things to be repugnant to the truth; as also what he writeth of a rock not far from Arklow, at the one fide whereof he faith that it always ebbeth, when it doth flow on the other; and to the contrary. Also that in Milford haven (fituated in the fouthernmost part of Wales, in a manner over against Waterford) and upon the next coasts, it ebbeth and floweth at quite contrary times to what it doth at Dublin, and the coast thereabouts; so that it should begin to ebb in Milford haven, when in the bay of Dublin it beginneth to flow, and to flow in Milford haven when it beginneth to ebb at Dublin: which how untrue it is, all those can witness, who having been in both places, have had the curiofity to observe the times and hours, at what age of the moon soever, wherein it doth begin to ebb and to flow there.

CHAP.

CHAP. VII.

Of the Springs and Fountains, item, of the Brooks and Rivulets of Ireland.

SECT. I.

Of the Springs and Fountains.

AVING sufficiently spoke of the sea wherein Ireland lieth, and of whatsoever belongeth thereunto; we shall now, before we come to treat of the land it self, speak of the waters within the land; first of the springs and brooks, afterwards of the rivers, and lastly of the loughs or lakes.

As for the first, to wit, fountains and springs, Ireland is very full of them every where, not only in the mountainous and hilly parts, but even in the flat and champain countries: which springs for the most part are all of one and the same fashion, being like unto a small pit full of water up to the brim; at the lower fide whereof the water doth run forth, without making any noise or bubling. For that kind of fountains which forcibly burst out of the side of a rock, or spout their water on high, are very rarely to be found in this kingdom. The water of these well-springs is for the most part cool, clear, and pure; free from all strange smell and taste: in which properties nevertheless, and in the wholsomness of the water, the same differences are found, and for the same causes, as in other countries. For those which spring out of a gravelly or sandy ground are purer than those that spring out of earth or clay; those that rise out of a stony or rocky ground, cooler than any of the former; those that are exposed to the sun, and freely receive the beams thereof, especially of the morning sun, have lighter and wholfomer water, although less cool than those which are contrarily seated; and to for the rest.

SECT. II.

Sparus and Holy-wells in Ireland.

A FEW years fince some fountains have been discovered in Ireland, some of them not far from Dublin, and others in other parts, whose veins running thro' certain minerals, and washing off the vertue of the same, yield a medicinal wa-

ter, apt to open the obstructions of man's body, and to cure other accidents thereof; which kind of fountains are commonly called Spaws, a name borrowed of a certain village in the country of Liege, in which there is a spring of that sort, absolutely the principallest, and the most effectual of all those of the same kind, and therefore of very great renown in near and in far countries. Besides these spaws there are also a great number of other fountains throughout all the land, called holy wells by the inhabitants, whose water not differing from that of other wells, in smell, taste, or in any other sensible quality, nevertheless is believed to be effectual for the curing of several diseases. But experience doth shew, that those vertues are not found in the springs themselves, but only in the vain imagination of the superstitious people; the which also having dedicated every one of those to some particular saint, do expect the supposed vertue rather from the power of them, than from any natural efficaciousness inherent in the water it self.

SECT. III.

Of the fabulous Fountains of Giraldus Cambrensis.

As for those wonderful springs mentioned by Giraldus Cambrensis, one in Munster, whose water presently maketh them grey that wash their head or beard therewith; one in Ulster, of quite contrary vertue, so that the persons washed therewith never come to be grey; one in Connaught, whose water good and commodious for the drinking, and other uses of men, is hurtful, yea deadly to cattle, sheep, horses, and all other forts of beasts; and yet another in the same province, the which being on the top of a high hill, far from the sea side, ebbeth and floweth twice a day, in the same manner as the sea, I could not hitherto come to the speech of any, who in our times had seen those fountains, or obferved any such thing in them, which maketh me doubt, that that good man hath been deceived herein by his credulity, as in innumerable other things, the which being evidently untrue and fictitious, are by him related for certain truths. As in this matter, who feeth not the idleness of that fiction concerning a certain fountain in Munster, whereof he writeth, that as soon as any body doth touch it, or but look at it, it beginneth prefently to rain most heavily over all the province, and continueth so to do, until a certain priest, appointed for that purpose, and who hath never lost his maidenhead, do appeale the fountain, in linging a mass in a chappel standing not far from thence, and built expressly tor that end; and in besprinkling the same sountain with holy water, and with the milk of a cow of one colour.

SECT. IV.

Of the Brooks in Ireland.

No country in the world is fuller of brooks, than Ireland, where the same be numberless and water all the parts of the land on all sides. They take their beginning three several manner of ways. Some have their source of sountains, the which for the most part are very small, not only those who carry the water but of one spring (most of which are rather like unto a gutter, than a brook) but even those into which the water of several sountains doth flow together. Others rise out of bogs, the which besides their own universal wetness being tull of springs, and by reason thereof gathering in them more water than they are able to drink in or contain, do necessarily send out the same in convenient places, and so give a beginning unto rivulets and brooks. The third fort take their beginning out of certain small loughs, which brooks ordinarily are of a reasonable bigness, and far surpass the other two sorts; although there do not want some, even of this kind, which are very little. And there is very sew of any of these kinds, who come to any notable bigness, as long as they continue to be solitary, and until having received the water of several other brooks, do thereby grow more considerable than they were in their first original.

These brooks, besides the great good they do the land in watering the same, and beside the commodity they afford of drenching the cattle and other beasts; do also greatly serve the inhabitants for another good use, to wit, the grinding of their corn, whereunto the windmills are very little used in Ireland, because they have the conveniency, through the great number of brooks, to erect watermills in every quarter where it is necessary: which bring a great profit to

the owners, being kept and maintained with less cost and labour.

SECT. V.

Of the swelling and overflowing of the Brooks.

Some of the brooks do flow in an equal bigness all the year long, without receiving any notable increase or diminishing: but far the major part do change according to the wet or dry seasons of the year, and as many of them as come out of the mountains, or run through hilly countries, swell so excessively, when any great rain doth fall, that they not only overflow the next low grounds, doing many times great damage in them, but also bring the way-faring men into great distress; for it cometh to pass very oft, that a brook, which ordinarily is very shallow and still, riseth so mightily through the multitude of the rain water, which from the next mountains and hills descendeth into it, that a good horse cannot pass without swimming, where at other times a child easily

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may wade over: and with that abundance of water is commonly joined so strong and impetuous a current, that man and horse are often carried away with it, to their extreme danger; and whatsoever we say herein of the brooks, is much more to be understood of the rivers, the which otherwise in convenient places or fords may be passed over; wherein the aforesaid danger is greater yet: so that few years pass in Ireland, in the which some persons are not drowned in that fashion.

SECT. VI.

Strange Invention of a Man to pass a Brook, greatly risen by the abundance of Rain.

It shall not be improper to insert here a particular observed by a very credible and reverend person, Theophilus Buckwort, bishop of Dromore, the which he hath several times related to my brother and others, being this; The Lagon, a little river or brook, which passeth by the town of Dromore, upon a certain time being greatly risen through a great and lasting rain, and having carried away the wooden bridge, whereby the same used to be passed at that town; a country fellow who was travelling that way, having stayed three days in hope that the water would fall, and seeing that the rain continued, grew impatient of staying longer, and resolved to pass the brook whatever the danger was; but to do it with the less peril, and the more steadiness, he took a great heavy stone upon his shoulders, whose weight giving him some firmness against the violence of the water, he passed the same without harm, and came safe to the other side, to the wonderment of many people, who had been looking on, and given him all for a lost person.

SECT. VII.

Of the Brooks of Drumcondra and Rathfarnum by Dublin.

OF these dangerous brooks there are two hard by Dublin, both running into the haven some what more than a mile from the city, the one at north side thereof, a little below the village Drumcondra, which is seated upon the highway from Dublin to Drogheda; and the other at the south side, close by the Rings-end. This called Rathsarnum water of the village by which it passeth two miles from the sea, and the same distance from Dublin, is far the worst of the two, as taking its beginning out of those great mountains southwards from Dublin, from whence after any great rain such abundance of water is descending to it, that the same, which at other times is of very little depth, groweth thereby so deep, and exceeding violent, that many persons have lost their lives therein; amongst others Mr. John Usher, father to sir William Usher that now is, who was carried by the current, no body being able to succour him, although

many persons, and of his nearest friends, both a-foot and horseback were by on both the fides. Since that time a stone bridge hath been built over that brook (as over Drumcondra water there hath been one from antient times) upon the way betwixt Dublin and Rings-end; which was hardly well accomplished, when the brook in one of those furious risings quite altered its channel for a good way, so as it did not pass under the bridge as before, but just before the foot of it, letting the same stand upon the dry land, and consequently making it altogether useless: in which perverse course it continued, until perforce it was constrained to return to its old channel, and to keep within the same. To go from Dublin to Rathfarnum, one passeth this river upon a wooden bridge; the which although it be high and strong, nevertheless hath several times been quite broke, and carried away through the violence of sudden floods; although at other times, and when that brook doth only carry its ordinary water, a child of five years may eafily and without danger wade through it; and a tall man on horseback riding underneath it, not being able to reach it; in the great floods the water many times rifeth so high, as that it doth not only touch, but floweth quite over the bridge.

CHAP. VIII.

Of the Rivers of Ireland.

SECT. I.

Of the Shannon.

ESIDES the excessive number of brooks wherewith Ireland is water d_g it hath a good many rivers, the which being broader and deeper than the brooks, are consequently navigable, although the major part are not portable of any great ships nor barques, but only of small vessels and boats.

The principallest of all is the Shannon, who taking his original out of Lough Allen, and in his course dividing the province of Connaught from Leinster, and afterwards also from Munster, passeth through two other great loughs, to wit, Lough Rec, whereout she cometh just above Athlone (a mean market town, but adorned with a stately and strong castle, the ordinary residence of the presidents of Connaught) and Lough Dergh, about half way betwixt Athlone and Limerick, and a little below the said town she dischargeth her self again into another lough, by far the biggest of all, the which extending it self from Limerick unto the sea, and above sifty miles long, it is held by the Irish as well as the English not for a lough, but for the Shannon it self, and consequently called with that name; whereof hath been spoken in the second chapter.

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This river is wide and deep every where, so as she would be navigable in her whole length, not only with boats of all forts, but with reasonable big ships, to the great commodity of them that inhabit near it, were it not for the impediment of a certain rock, some six miles above Limerick, the which standing across in the channel, and the river with great violence falling downwards over it, all communication of navigation betwixt the upper and the lower parts of

it is thereby absolutely hindred.

Sir Thomas Wentworth, lord Wentworth, and afterwards earl of Strafford, he that in the beginning of this present parliament was beheaded, having been governor of Ireland many years, first in the quality of lord deputy, and afterwards of lord lieutenant, had a design to take away that let, in causing of a new channel to be digged for a little way, whereby the river being made to alter her course, should have avoided that rock; and to that purpose sent certain skilful men thither to view those parts, and carefully to examine whether it were seasible, who made report that it might be done, and would not cost above seven or eight thousand pounds sterling, a sum not very considerable in comparison of the great profit which afterwards would have been reaped from that work: nevertheless it was never taken in hand, the intents of publick utility having been diverted and smothered by those of private profit, as commonly it falleth out.

SECT. II. The Rivers Suck, Sure, Ourc, Broad-water, Barrow and Slane.

THERE are several other rivers in the province of Connaught, but none of them is any ways comparable with the Shannon for length, breadth, or depth, and little to be said of them, but that the Suck, the which falleth into the

Shannon a little way below Athlone, is the principallest of all.

The two chief rivers of Munster are Sure and Broadwater, the city of Waterford being situated upon the first of those two, the which close by it dischargeth herself into that arm of the sea which is known by the name of Waterford haven. The other passeth by Lismore, and falleth into the sea by Youghal, where it maketh a tide haven. Next to those two is the river of Cork, and then that of Kinsale, the which is but of small moment, as also are the rest of the rivers of this province.

In Leinster is the Nure or Oure, the Barrow, the Slane, the Liffy, and the

Boyn, besides some others of less moment.

The Oure and Barrow do mingle their waters at the town of Ross, from whence having past a little way together, they discharge themselves into the right arm of the haven of Watersord, and so in a manner do meet the Sure, who salleth into the other arm: for which consideration these three rivers were wont to be called the three sisters, as Giraldus witnesseth. Both the Oure and the Barrow are portable many miles into the country; the Oure only with little boats, and with cots (they call in Ireland cots things like boats, but very unshapely, being nothing but square pieces of timber made hollow) but the

Barrow with good big boats. The Slane falleth into the haven of Wexford, being like unto the Oure for length and bigness.

SECT. III. Of the Liffy and the Boyn.

THE Lifty is the princess of the Irish rivers, not for her bigness (for not only the Shannon, but the Boyn, Barrow, and several others, do far surpass her therein) but because Dublin, the chief city of all Ireland, is seated upon her bank: a mile below which city, at a place called Rings-end, she loseth herself in a bay of the sea, which is called Dublin haven. With the help of the flood, thips of fifty and threefcore tunns can make a thift to come up to the key of Dublin, but when the tide is out, and at the lowest, the smallest boats find hardly water enough to go between Dublin and Rings-end, because the channel being very broad there, the water spreadeth it self too much, and by reason thereof groweth very shallow. But in the city it self, where she is inclosed betwixt the keys on both fides, and from the bridge of Dublin until the bridge of Kilmainham, and a little further, being somewhat more than a mile (in which space she runneth between her own banks) great boats may go upon her at any time. She would be navigable with boats some three or four miles further; but the weres, made in her a little way above the bridge of Kilmainham, do hinder that. This river taketh her beginning in the mountains lying to the fouth of Dublin, not above ten miles from it; but fetcheth such a compass (bending her coast first to the west, afterwards to the north, and lastly, for seven or eight miles, eastward) that from her original to her mouth is the space of no less than forty or fifty miles.

The Boyn the river whereon Tredagh is seated, hath her beginning in King's county, close by the original of the Barrow, although the place where the Barrow falleth into the haven of Waterford, is above fourscore miles distant from the mouth of the Boyn. This river is almost of an equal bigness in far the greatest part of her course, and would be portable of good big boats very many miles

into the land, if that were not hindred by the weres.

SECT. IV. Of the Bann and Blackwater.

The principal river in Ulster of those that fall directly into the sea, is the Bann, the which as in her mouth, she is incumbred with several inconveniencies, as we have declared above in the third chapter, so she is portable but a few miles from the sea, because of a certain rock, the which running across the channel from the one bank to the other, stoppeth all manner of passage, not only of bigger vessels and barks, but of the smallest boats, which dare not come near the same rock, because it being somewhat high, and the water from it falling downwards with great violence, it goeth for some space with a mighty current. This rock or cataract, called vulgarly the salmon-leap (for a reason hereaster to be declared) and the fall, because of the falling down of the water, is not above

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four miles from the sea, hindring all manner of communication between the same and Lough Neagh, from the which this cataract is distant about three miles: whereas otherwise, if the passage of this river from the sea to the lough were open, ships might by that means go a great way into the land, not only the whole length and breadth of Lough Neagh (which every where is very deep, and navigable even for great ships) but even a good many miles farther (with good big boats) by means of some rivers that sall into it, especially the Blackwater, which is the principallest of them all. For the Bann, although she giveth the name to the river going out of the lough, is not comparable to the Blackwater for breadth nor depth, being rather a brook than a river, the which being very shallow at other times, doth rise so excessively upon the salling of much rain, that it is one of the most dangerous and terrible brooks of all Ireland, in the which therefore from time to time many men and horses have been drowned at the passing of it.

SECT. v. Of the Lagon and Newry-water: Tide Rivers.

Besides the Bann and the Black-water, there is scarce any other river in Ulster, but that which passing by Strabane and Londonderry, dichargeth it self into Lough Foyle. For the Lagon, heretofore mentioned by us, which by Belfast falleth into the sea; the Newry water, whereof we have spoken in the description of Carlingsford haven; and some others of that nature, are properly brooks, and not portable by reason of their own water, but of that which out of the sea floweth into them; as appeareth clearly when the tide is out. For then they are as small, and as little portable in those places, where the boats and bigger vessels do pass at high water, as are they at all times in those places unto which the tide doth never reach: which kind of tide rivers or brooks, which only by the coming in of the tide are made navigable for a little way, are to be found in all the provinces of Ireland.

SECT. VI. Of the Cataracts in the Irish Rivers.

Besides that the navigable rivers are but rare in Ireland, and that the most part of them are only portable of very small vessels and boats, not of any bigger ships or barks, as appeareth by the former relation, there be very sew rivers, who have not some impediment or other in them, whereby it cometh that they are not portable so far as otherwise they would be. These impediments are chiefly three in number, cataracts, weres, and fords; whereof the last two do only concern the lesser rivers. The first, to wit, the cataracts, are incident to the greatest rivers as well as to others, as may appear by what we have said concerning them in the description of the Shannon and the Bann; whereby also fully may be conceived the manner and nature of the said cataracts, so as it is needless here again to delineate them.

Such a cataract or fall there is found in the Liffy, seven miles from Dublin, and about a quarter of a mile above the village and castle of Leslip, the descrip-

tion of which as holding it not improper for this place, we shall here set down as it came to our hands from those who have observed it very exactly. The said river running thereabouts along a narrow and deep valley, being hemmed in at both fides with high hills of a long continuance, hath a very rocky channel, and besides that the bottom is overspread in several parts with great massy stones, there is in two or three places, at no great distance, a continual rocky bulk reaching from one fide to the other, leaving but one or two narrow paffages, through which the stream runneth with a very strong current, and a mighty noise, but the third and last bulk, like a cataract hath the channel close to it, a great deal lower (by far more than the other, at least by seven or eight feet) which is the cause that the stream doth not so much run swift here, or passeth with a current through narrow channels, as in the two first bulks, but as soon as it is got over the rock it falleth steep down with great violence, the space of three or four paces in breadth; whereas the remainder of the main channel is altogether stopp'd by the said rock. In winter and other very rainy seasons, when the water doth increase much, it passeth over all the said rocks smoothly and without noise, where the same is exceeding great, those times, when the Liffy runneth with a small stream.

There is also a cataract in a small tide river in the county of Cork in Munster, the which falleth into the innermost corner of the great bay Bantry, and one in the haven of Ballyshannon, which haven being in effect nothing else but the mouth of Lough Earn, commonly is counted for a river, and called by the

name of Trowis.

SECT. VII. Of the Fords in the Rivers of Ireland a second Impediment of their Navigableness.

CONCERNING the fords; it is to be observed, that not every where, where the high-ways meet with great brooks or small rivers, bridges are found for to pass them, but that in very many places one is constrained to ride through the water it self, the which could not be done, if the rivers kept themselves every where inclosed between their banks; wherefore they are not only suffered in fuch places, to ipread themselves abroad, but men help thereto as much as they can, to make the water fo much the shallower and consequently the easier to be pass'd: whereby it cometh many times to pass, that a river which above and below the ford is deep enough to be portable of great boats, through the shallowness of the fords lying between, will bear none but of the very smallest; or where otherwise the same would carry small boats is not portable at all; this in most places might easily be remedied, in raising of dikes or artificial banks, where the natural ones failing do minister opportunity unto the rivers for to spread themselves; and making bridges to pass over. Some fords, do not greatly impair the channel of the rivers, but leave the same almost in her full depth, especially in the midst: but the same, as they are more incommodious for the traveller, so they are not very frequent, but in far less number than the others.

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SECT. VIII. Of the Weres, a third Impediment of the Navigableness of the Rivers in Ireland.

The weres, a third let of the navigation of the Irish rivers, are thus ordered: they set up very big stones in the river, close together from the one side of the river to the other, leaving only one hole, either in the midst, or near one of the sides, before which hole a basket being laid, they take therein a great quantity of sish; for coming to the weres, and finding their way stopt by the stones, they take their course to that place where they find an opening. These rows of stones do not directly cross the river from the one side to the other, but do go very much sloaping, that the stream with less force may beat against them: and the same also do stand but very little above the water, to the end that when the floods come the water may find a ready passage over them, without which they would not be able to subsist against the force thereof, but easily be thrown down and scattered.

Some weres are set up, not so much for the taking of fish, as for mills, and that the course of the water thereby being in part stopp'd in the main channel, may be made to go into some little by-channel, cut expresly for to conveigh

the water to the mill: many weres ferving for both thele uses jointly.

Some rivers have only one of these impediments, as the Shannon and the Bann, each a sall or cataract: the Boyn, weres; having only fords many miles from the sea. The greatest number have weres and fords, and commonly each of them in several places. Some have all three, as the Liffy by name, which hath not only weres and fords in several places, but also a cataract or salmon-leap, as hath been mentioned above.

CHAP. IX.

Of the Lakes or Loughs in Ireland.

SECT. I.

Of the little Loughs.

OUGHS there is a very great number in Ireland, especially in the provinces of Ulster and Connaught, we may distinguish them into three several sorts, great, middle sort, and the least. Under this last we comprehend all such whose parts discover it self to the eye all over at one time. This sort of loughs are sound in several places of the other provinces, but nothing near so many as in Ulster. Every one of these commonly sends forth a brook, and some more than one, being all of them very deep (the very least

not excepted) and well stored with fish: so as they are not only delightful, especially such as are situated in some dale or valley, or environed round about, or on some sides with pleasant little hills (as it falleth out in the greatest part of them) but also commodious and profitable, affording good opportunity to build houses and castles upon their borders, which was done in many places by the English and Scots, who had made several fair plantations, and would have done more, if it had not been hindred by that horrible rebellion of the bloody Irish; in the beginning of which many of them which were already built have been destroyed by those barbarians.

Many of those little loughs have a little island in the midst, which is both commodious and pleasant. Some wherein little islands do float, not keeping long any certain place, but removing to and fro as the force of the wind doth

drive them.

SECT. II. Of the middle fort of Loughs.

THE middle fort of loughs we understand to be such as far exceeding the forementioned in bigness, nevertheless are not to be compared with the biggest sort, of which we shall speak presently: of this kind are Lough Fin and Lough Dirg in the county of Dunnagal in Ulster, Lough Mugney in the county of Monaghan, and Lough Silline in the county of Cavan, both in the same province; Lough Ramore in east Meath: besides several others in other counties of Leinster, especially in Queen's county, Longford, and west Meath, having little or nothing worthy of observation.

SECT. III. Of the great Loughs, and first of those of salt Water.

The great loughs are of two forts, either of sweet water, as all the former; and some of salt water; these last being such through the mixture of the sea; the which sinding an open entrance, and twice a day with the tide sully flowing into them, maketh the water so salt. And it would be no great error to take all those loughs wherein that happeneth, (viz. Lough Cone, in the county of Down; Lough Foyle, in the county of Colrain; Lough Swilly, in Tirconnel; and the lough of Cork) rather for inlets of the sea than for lakes, although in this number is also to be put that great lough betwixt Limerick and the sea, through which the Shannon dischargeth it self into the sea; of the which we have already spoke once or twice heretofore.

SECT. IV. Of Lough Earn, Lough Neagh, and the rest of the great Loughs.

AMONGST the great loughs of sweet water, are far the principallest Lough Earn and Lough Neagh, the first of which is situated in the confines of Ulster and Connaught, being in effect two different loughs, joined together only by a short and narrow channel; of which two, that which lieth farthest within eft

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the land, doth extend it self in a manner directly north and south; but the second, which is next to the sea, doth lye east and west; so that both together they have the fashion of a bended elbow, being both very broad in the midst, growing by degrees narrower towards both the ends.

Lough Neagh lyeth in the north easterly part of Ulster, bordering upon the counties of Tyrone, Ardmagh, Down, Antrim, and Colrain, being of a round,

or rather somewhat oval figure.

Next in bigness to these two is Lough Corrie, the same on whose nether end the city Galloway is seated: the two loughs thorough which the Shannon passeth, Lough Ree, and Lough Dirg: item, Lough Fingarrow in Connaught,

betwixt the counties of Mayo and Roscommon.

In the last place, as the least of this sort, are Lough Allen, out of which the Shannon taketh his original, being nine miles long, and three miles broad: Lough Maske, situated betwixt Lough Fingarrow and the lough of Galloway; and Lough Larne, in the county of Kerry in Munster, not far from the upper end of those two samous bays Dingle and Maire. The least of these is some miles long and broad, and many miles in circuit; but the biggest are of so vast a compass, that they are more like a sea than a lough.

SECT. v. Of the Islands in the Loughs.

Most of these great loughs are very full of little islands, and above all Lough Earn, in which the same are numberless. In Lough Cone also there is so great a number, that those who inhabit about it, affirm them to be two hundred and threescore. Lough Ree, and Lough Dirg are likewise very full of them: and there is also a good many in Lough Fingarrow, Lough Larne, and Swilly. But Lough Foyle is very free from them, and in the lough of Cork there is not above one or two, as likewise in Lough Neagh, in which they lye near to the sides, leaving the midst altogether free.

Very few of these islands are inhabited or planted; but the most part being plentifully cloathed with very sweet grass, serve for pastures to sheep and other cattle, the which do thrive wonderfully well in them, and the same befalleth also in the middle fort of loughs, amongst which likewise there be very sew that

have not some of these little islands in them.

In some few of these islands, especially of Lough Earn and Lough Ree, are some dwellings, whereunto persons who love solitariness were wont to retire themselves, and might live there with much contentment, as finding there not only privacy and quietness, with opportunity for studies and contemplations, but there besides great delightfulness in the place it self, with variety of very sweet passimes in sowling, sishing, planting and gardening. In one of the greatest islands of Lough Earn, sir Henry Spoteswood had a fine seat, with goodly buildings, gardens, orchards, and a pretty little village, with a church and steeple belonging to it, which whether it is in being yet, or destroyed by the barbarians and bloody rebels, I am not informed. In Lough Silline in the county

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of Cavan in an island not far from the bank where the river Nannei runneth into it, is a castle built of form four square, which covereth the whole isle, much after the manner of the fort Enniskilling in Lough Earn, and so many more too long to be rehearsed.

SECT. VI. Of Saint Patrick's Purgatory.

ONE of these little islands situated in Lough Dirg (one of the middle fort of loughs) hath been very famous, for the space of some ages, over almost all Christendom; because the world was made to believe, that there was the suburbs of purgatory, into which whoso had the courage to go, and remain there the appointed time, did see and suffer very strange and terrible things: which persuafion having lasted until our times, the matter hath been discovered within these few years, and found to be a meer illusion. This discovery was made during the government of Richard Boyle, earl of Cork, and Adam Loftus, viscount of Ely, and lord chancellor of Ireland: which two being lords justices of that kingdom in the last years of king James, and desirous to know the truth of the bufiness, sent some persons of quality to the place, to inquire exactly into the truth of the whole matter. These did find, that that miraculous and fearful cave, descending down to the very purgatory and hell, was nothing else but a little cell, digged or hewn out of the rocky ground, without any windows or holes, fo as the door being shut one could not see a jot within it; being of so little depth, that a tall man could but just stand upright in it, and of no greater capacity, than to contain fix or seven persons. Now when that any person desirous to go that pilgrimage to purgatory, was come into the island, the friars, fome small number whereof made their constant abode there for that purpose, made him watch and fast excessively: whereby, and through the recounting of strange and horrible apparitions and fantasms, which he would meet withal in that subterranean pilgrimage, being well prepared, they did shut him up in that little dark hole, and being drawn out again from thence after some hours, altogether astonished and in a maze, he would be a good while before he came again to himself, and afterwards the poor man would tell wonderful stories, as if in very deed he had gone a great way under the ground, and seen and suffered all those things, which his weak imagination, altogether corrupted by the concurrence and fequel of fo many causes to weaken the brain, did figure unto

To prevent this delusion in future times, the said lords justices caused the friars to depart from thence, their dwelling quite to be demolished, and the hole or cell to be broke open, and altogether exposed to the open air, in which state it hath lain ever since: whereby that pilgrimage to purgatory is quite come to nothing, and never hath been undertaken since by any.

To beget the greater reputation to this fictitious purgatory, the people was made to believe, that Saint Patrick, by whom the Irish were converted to the christian faith about four hundred years after the nativity of Christ, had caused

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the same, and obtained it of God by his prayers, to convince the unbelievers of the immortality of the soul, and of the torments which after this life are prepared for the wicked persons; wherefore also they gave it the name of Saint Patrick's purgatory. But it is very certain, that nothing of it was known in Ireland during the life of that holy person, nor in a huge while after, it having been devised some ages after his death, when that the general darkness of the times ministred a great opportunity of such like inventions, to those kind of men that knew how to abuse the blind devotion of ignorant and superstitious people to their own profit and filthy lucre.

SECT. VII. Of the Property of Lough Neagh, of turning Wood into Stone.

BEFORE we make an end of this chapter, we must say something of the wonderful property which generally is ascribed to Lough Neagh, of turning wood into stone; whereunto some do add, to double the wonder, that the wood is turned not only into stone, but into iron; and that a branch or pole being fluck into the ground somewhere by the side where it is not too deep, after a certain space of time one shall find that piece of the stick which stuck in the ground, turned into iron, and the middle, as far as it was in the water, into stone; the upper end, which remained above the water, keeping its former nature. But this part of the history I believe to be a fable: for my brother, who hath been several times in places not far distant from that lough, and who of the English thereabouts inhabiting hath enquired this business with singular diligence, doth affure me, that he never could learn any fuch thing; but that the turning of wood into stone was by every one believed for certain, as having been tried divers times by several persons: saying moreover to have understood of them, that the water hath this vertue only at the fides, and that not everywhere, but only in some few places, especially about that part where the river Blackwater dischargeth herself into the lough. He could never come to speak with any persons, who themselves had tried this matter; but with several, who asfirmed, that to their knowledge it had certainly been done by others of their acquaintance. For further confirmation of this particular (which in it self is credible enough, seeing that in many parts of the world there are found waters indued with that vertue) ferveth, that here and there upon the borders of that lough are found little stones of a pretty length, some of them round in their compass, others flat, or flattish, and some angulous, the which being looked on, as well near as from afar off, seem to be nothing else but wood, and by every one are taken for such, until one come to touch and handle them: for then by their coldness, hardness and weight, it appeareth that they are not wood but stone: whereby it may probably be conjectured, that the same formerly having been wood indeed, and to having kept their old shape and fashion, in length of time have been turned into a stony substance by the vertue of that water, whereinto they were fallen through the one accident or other.

Giraldus writeth, to have heard of a well or fountain in the north quarters of Ulster, the which in seven years space turneth into stone the wood cast into it: but seeing that no body now a days knoweth of any such well, and that with all my enquiries I could never come to hear any news of it, I will believe, that Giraldus hath been misinformed, and that they have told him that of a well which was proper unto this lough.

CHAP. X.

Of the Nature and Condition of the Land, both for the outward Shape, and for the internal Qualities and Fruitfulness.

SECT. I.

Distinction of Ireland into champain Lands, Hills, and Mountains.

HE lands of this island, as of most all other countries, are of a various kind and fashion: for some parts are goodly plain champain, others are hilly, some mountainous, and others are composed of two of these sorts, or of all three together, and that with great variety, the which also is very great, in those three uncompounded sorts.

SECT. II. A necessary Observation about the Use of the Words Hill and Mountain.

To avoid all ambiguity, and make our selves clearly understood in what we have faid, and are further to fay upon this subject, we think it necessary to forewarn our reader, that we do use the word bill in a narrower signification, than what is given to it in the ordinary use of speech. For whereas all, or most other languages, both those which are now in vulgar use, and those which are only preserved in books, have two several words for to signify those observable heights which appear above the ground, calling the bigger fort by one name, and the lesser fort by another: the English language useth one and the same word for both, calling bills as well the one as the other, without any other distinction, but that sometimes the word small or great is added. Now because this word so indifferently used would cause some confusion in the matter we treat of, that hath made us restrain it to one of the sorts, and to call bills only the leffer fort, called in Latin collis, in French colline, in Dutch heuvel, and in Irish knock. As for the other and bigger fort, whose name in the aforesaid four languages is mons, mountain, berg, slew, we call them mountains: which word mountains, although it be good English, yet in common speech it is seldom made use of in that sense whereunto we apply it, but only to signify a country wholly consisting of those great hills, especially when the soil thereof is lean and unfruitful.

SECT. III. Of the Mountains of Ireland, and first of the lower sort.

THE difference betwixt hills and mountains confisting in bigness, is of two forts; for in the number of mountains are counted not only those which lift up themselves very high into the air, so as they may be seen many miles off, but also those, the which take up the more in length and breadth, what is want-

ing to them in height, ascending slopingly by degrees.

The mountainous parts of Ireland do for the most part consist of this second part of mountains, most of them in one quarter being much what of the same height, so as sometimes one shall ride some hours together, through the mountainous country, without meeting with any one mountain that greatly excelleth in height above the rest: the which in particular may be observ'd in the mountainous country of the Fewes, betwixt Dundalk and Ardmagh; in that of Mourne, betwixt the Newry and Dundrum (each of these two being above twelve miles long) in all that space which is betwixt Kells, a wall'd town in the county of Eastmeath, and Kilacolly, alias Bailieborrough, in the county of Cavan, which being ten miles long, is almost nothing else but a continuance of hills of no great bigness, all very fruitful land both pasture and arable. In the county of Westmeath, from Lough Crew to Lough Silline, and beyond it, as far as Ballaneach, where Mr. William Fleving had built a fair house and farm ten years before the late detestable massacre and bloody rebellion of the Irish. These hills are for the most part low and small, yet some of a good height and bigness; the ground lean, in many places very stony, in some rocky, not of any one continual rock, but by piecemeals here and there rifing and appearing. Yet are these hills in several places wet and moorish, as well in the rocky as other parts. These hills serve only for pasture of sheep. In the major part of the mountainous country of Wicklow, the which beginning five miles to the fouth of Dublin, doth extend it self above fifty miles in length; and in several other parts.

It hath been observed in many parts of Ireland, but chiefly in the county of Meath, and further northward, that upon the top of the great hills and mountains, not only at the side and foot of them, to this day the ground is uneven as if it had been plowed in former times. The inhabitants do affirm, that their forefathers being much given to tillage, contrary to what they are now, used to turn all to plow land. Others say that it was done for want of arable, because the champain was most everywhere beset and overspread with woods, which by degrees are destroyed by the wars. They say further, that in those times, in places where nothing now is to be seen, but great logs of a vast extent, there were thick woods, which they collect from hence, that now and then trees are digged out there being for the most part some yards long, and

some of a very great bigness and length.

SECT. IV. Of the higher fort of Mountains in Ireland.

As For those other mountains, the which with an excessive height rise up towards the skies, they are not very common in Ireland; and yet some there be, which although not comparable with the Pyrenæi, lying between France and Spain, with the Alpes, which divide Italy from France and Germany, or with other mountains of the like vast height, nevertheless may justly be counted among the lofty mountains. Of this number are the mountains of Carlingford, betwixt Dundalk and Carlingford, the which in a clear day may eafily be feen from the mountains to the fouth of Dublin, the which are more than forty miles distant from them; the mountains about Lough Swilly, in the north parts of Ulster, the which may be seen many miles off in the sea; the Curlews, that fever the counties of Slego and Rosscommon in Connaught; the twelve mountains in the north quarter of the county of Tipperary in Munster, the which far exceeding the rest of the mountains there, are known by the name of the twelve bills of Phelim ghe Madona; Knock Patrick, in the west part of the county of Limerick, not far from the bay of Limerick, which mountain can be feen by the ships, which are a huge way from the land yet; the mountains of Brandon hills, in the county of Kerry, to the east of the haven of Smerwick, the which are discovered by the sea-faring men, when they are above fifty miles from the land; in the northwest quarter of the county of Waterford, called Slew Boine; that in the mountainous country of Wicklow, which for its fashion's sake is commonly call'd the Sugar-loaf, and may be feen very many miles off, not only by those that are upon the sea, but even into the land.

SECT. v. Nature of the Ground in Ireland, and of the fruitful Grounds.

NEXT to the foregoing division of Ireland taken from the fashion and outward form of the land, cometh to be considered that which consisteth in the nature of the soil or ground; some parts of the country being fruitful, and others barren.

The fertile soil is in some places a blackish earth, in others clay, and in many parts mixt of both together: as likewise there be sundry places, where the ground is mixt of earth and sand, sand and clay, gravel and clay, or earth; but the chalk ground and red earth, which both are very plentiful and common in

many parts of England, are no where to be found in Ireland.

These grounds differ among themselves in goodness and fatness, not only according to the different nature of the soil whereof they consist, but also according to the depth of the mold or uppermost good crust, and the nature of the ground which lieth next to it underneath: for the best and richest soil, if but half a foot or a foot deep, and if lying upon a stiffy clay or hard stone, is not so fertile, as a leaner soil of greater depth, and lying upon sand or gravel, through which the superstuous moisture may descend, and not standing still, as upon

Chap. X. the clay or stone, make cold the roots of the grass, of corn, and so kurt the

whole. There be indeed some countries in Ireland, where the ground underneath being nothing but stone, and the good mold upon it but very thin, it is nevertheless very fruitful in corn, and bringeth sweet grass in great plenty, so as sheep and other cattle do wonderful well thrive there; which kind of land is very common in the county of Galloway, and in some other counties of Connaught, as also in sundry parts of the other provinces. But the reason thereof is in those parts, because the stone whereon the mold doth lye so thinly, is not free-stone, or any such cold material, but lime stone, which doth so warm the ground, and giveth it so much strength, that what it wants in depth, is thereby largely recompensed.

SECT. VI. Causes hindring the Fruitfulness of the Ground, where the Soil otherwise is not bad.

EXCEPT in the case now by us declared, neither corn nor grass will grow kindly, where the ground, though otherwise good, is not deep enough, as alfo where it hath a bad crust underneath: from whence it cometh, that in many places, where the grass doth grow very thick and high, the same nevertheless is so unfit for the food of beatts, that cows and sheep will hardly touch it (especially if they have been kept in better pastures first) except that by extreme famine they be compelled thereto; and that by reason of the coarsness and sourness of the grass, caused by the standing still of the water, the which through the unfitness of the nether crust, finding not a free passage downwards, maketh cold the good mold, and the crop and grafs degenerate from its natural goodness.

For the same reason the land in many parts, where otherwise the soil in it felf would be fit enough to produce good wheat or barley, will hardly bear any thing else but oats, or rye, and that none of the best: as in other parts, the fault is in the foil it felf, and by the leanness thereof it cometh, that nothing else but coarse grass, and the worst kinds of grains will grow there. And unto these causes may be joined another yet, the overshadowing of high and steep mountains and hills, whereby the fides thereof, and the lands lying close under them, being deprived of the free and seasonable access of the sun beams, and so wanting convenient warmness, cannot afford to the things growing thereon fuch good and well concocted nourishment, as unto the producing of the best

and richest forts of grains and grass is requisite.

SECT. VII. Ireland a very fruitful country, especially for Grass.

THESE defects are not peculiar to Ireland, but common to other countries, and no ways general in it, but only here and there in distant parts; and where they are, they may be amended by the means fit and usual for that purpose, whereof by-and-by we shall speak particularly: therefore they cannot hinder,

country.

that Ireland should not justly be counted among the fruitfullest countries of the world. And although Orofius, who preferreth it even before England in this particular (Hibernia solis cœlique temperie magis utilis Britannia, are his words) goeth too far, yet fully true is the faying of Stanyburst, in the preface of his Irish chronicle, Cum Hibernia, cœli salubritate, agrorum fertilitate, ubertate frugum, pastionis magnitudine, armentorum gregibus, conferre paucas, anteferre nullas valeas: that is, With Ireland for wholfomness of air, fruitfulness of lands, great store of corn, abundance of pastures, and numerousness of cattle, few countries may be compared, none preferred: as also that of Giraldus, Gleba præpingui uberique frugum proventu fælix est terra, & fæcunda frugibus arva, pecore montes: that is, This country is happy in very rich ground, and plentiful increase of grains, the fields being fertile in corn, and the mountains full of cattle. But although Ireland almost in every part, where the industry of the husbandman applieth it self thereto, bringeth good corn plentifully, nevertheless hath it a more natural aptness for grass, the which in most places it produceth very good and plentiful of it self, or with little help: the which also hath been well observed by Giraldus, who of this matter writeth thus: Pascuis tamen quam frugibus, gramine quam grano focundior est insula, This island is fruitfuller in grass and pastures, than in corn and grains. And Buchanan in the second book of his history of Scotland calleth the pasture ground of Ireland pascua fere totius Europæ uberrima, the fruitfullest pasture ground of most all Europe.

SECT. VIII. More of the Plenty and Goodness of the Irish Pastures.

THE abundance and greatness of the pastures in Ireland, doth appear by the numberless number of all forts of cattle, especially of kine and sheep, wherewith this country in time of peace doth swarm on all sides, whereof in another place shall be spoken more at large: and the goodness of the same is hereby sufficiently witnessed, that all kind of cattle doth thrive here as well in Ireland, and give as good milk, butter, and cheese (with good handling) as in any other

It is true, that the Irish kine, sheep, and horses, are of a very small size: but that doth not come by reason of the nourishment and grass, but through other more hidden causes, may easily be demonstrated by the goodly beasts of the forenamed kind, that are brought thither out of England, the which not only in themselves, but in all their breed, do fully keep their first largeness and goodness, without any the least diminution in any respect, so that before this last bloody rebellion the whole land, in all parts where the English did dwell, or had any thing to do, was filled with as goodly beasts, both cows and sheep, as any in England, Holland, or other the best countries of Europe: the greatest part whereof hath been destroyed by those barbarians, the natural inhabitants of Ireland, who not content to have murthered or expelled their English neighbours (upon whom with an unheard of and treacherous cruelty they sell in the midst of a deep peace, without any the least provocation) endeavoured quite to extinguish the memory of them, and of all the civility and good things

part

by them introduced amongst that wild nation; and consequently in most places they did not only demolish the houses built by the English, the gardens and enclosures made by them, the orchards and hedges by them planted, but destroyed whole droves and flocks at once of English cows and sheep, so as they were not able with all their unsatiable gluttony to devour the tenth part thereof, but let the rest lye rotting and stinking in the fields.

The goodness of the pastures in Ireland doth further appear by this, that both beef and mutton there, as well that of the small Irish, as that of the large English breed, in sweetness and savouriness doth surpass the meat of England it self (as all those, who have tried that must confess) although England in this parti-

cular doth surpass almost all the countries of the world.

Nevertheless the saying of Pomponius Mela, that the grass here is so rank and sweet, that the cattle do burst, if they be suffered to seed too long, wherefore they be sain every day to drive them betimes out of the pastures, Juverna adeo luxuriosa herbis, non lætis modo, sed etiam dulcibus, ut se exigua parte diei pecora impleant, & nist pabulo prohibeantur, diutius pasta dissiliant: the which also hath been repeated by Solinus, Hibernia ita pabulosa, ut pecua ibi, nist interdum à pascuis arceantur, in periculum agat satias: that is, Ireland hath such excellent pastures, that cattle there are brought into danger of their lives by over-feeding, except now and then they be driven out of the fields; is a mere sable, no ways agreeable to the truth: for all kinds of cattle here, as in other countries, are continually left in the pastures day and night: neither do they through their continual seeding ever burst, or come into any danger of bursting.

CHAP. XI.

Of the several Manners of manuring and enriching the Ground practised in Ireland.

SECT. I.

In some part of Ireland the Ground never needs dunging.

O amend the lean and faulty grounds, to enrich both them and the good ones, and to keep both the one and the other in heart, in preserving them from being exhausted, the dunging of the ground is usual in Ireland as in other countries. It is true, that as approved authors assure us, in the island of Zealand, part of the kingdom of Denmark, the natural richness of the ground is such, and so lasting, as it needeth not the succour of any artificial helps, but is very fruitful, and aye preserveth its tertility, without putting the husbandman to the labour and costs of dunging. That likewise there is some

part in the province of Munster in Ireland, where very credible persons have assured me, of their own knowledge, that the land never needeth any dunging; so as the inhabitants thereof never trouble themselves to keep the dung of their beasts, but from time to time sling it into a river which runneth by them. But this happiness and richness of soil as it is very rare over all the world, so in Ireland too, being confined to very narrow bounds, all the rest of the kingdom is necessitated, for the ends aforesaid, to help and improve their lands by dunging; the which they do several manner of ways.

SECT. II. Of Sheeps Dung.

The commonest fort of manuring the lands in Ireland, is that which is done with the dung of beasts, especially of cows and oxen, and also of horses mixed with a great quantity of straw, and having lain a long while to rot and incorporate well together: whereof, as of a matter every where known and usual,

it is needless to speak further.

Only thus much seemeth good to us not to pass over in silence, that if sheep here, as in other countries, were housed and kept up in stables for any long time together, their excrements would make better dung, than that of any other four-tooted creatures. For the land on which sheep have fed for two or three years together, or longer, is so greatly enriched thereby, that when it cometh to be plowed, it bringeth a much fairer and plentifuller crop, than if from the beginning it had been made arable, and dunged after the ordinary manner. Wherefore also great sheep-masters may set their land, where the sheep have been feeding some years together, as dear again by the acre, than what at the

first they could have got for it of any body.

Wherefore also it is an usual thing in Ireland, as well as in England, to drive the sheep upon the fallow, and to keep them there until all the herbs which may minister any food unto the sheep be by them consumed; which doth the ground a great deal of good, and giveth it heart to bring afterwards the better increase. And the same also helpeth greatly for to make good grass grow upon the arable, when the same is turned into pasture and meadow; a thing ordinarily used in sundry parts of Ireland, and many times necessary for to keep the lands in heart: for ground being plowed, and the sheep driven thither as soon as any herbs grow upon it, they do not only consume the thistles, and other useless herbs, but cause good grass to grow up in lieu thereof, and that speedily. For in all places where their dung lighteth, of the best and sweetest forts of grass do grow, and that within the first year, which otherwise would not have come in much longer time, and that nothing near so good generally.

SECT. III. An useful Observation about Cows Dung.

THERE is a notable difference betwixt sheeps dung and that of other cattle, as in the goodness and richness it self, so in the particular last mentioned by them. For that of oxen and cows is no ways fit for dunging until it is grown old, and

hath lain a foaking with straw a great while: daily experience shewing in Ireland, as in England and other countries, that in those places of the pastures where the fresh cow dung falleth and remaineth, the grass the next year doth grow ranker and higher than in the rest of the same fields, but so source and unpleasing, that the beasts will not offer to touch it; so as ordinarily you shall see these tusts of grass standing whole and undiminished in the midst of pastures, that every where else are caten bare and to the very ground. The which as in part it may be imputed to the quantity of the dung, the which being greater than the earth can well digest, and conveniently unite with it self, cannot be turned into so good and sweet nourishment; so doth it also without doubt come in part through the very nature of the dung, the which of it self, and without a long preparation and alteration, is not so fit to nourish the ground, as that of sheep.

SECT. IV. Of Pigeons Dung.

PIGEONS dung also is very convenient for the improvement of the ground; and I know some in Ireland, who having tried that, have sound a wonderful deal of good in it, incomparably more than in that of any four-sooted beasts, and of sheep themselves. But the pigeon houses no where in Ireland being so big as to afford any considerable quantity, and never having heard of any body there who could dung more than an acre or two with all the pigeons dung which had been gathering the space of a whole twelvementh, it cannot well be reckoned among the common forts.

SECT. v. Of Ashes and Mud.

BESIDES the dung of beafts there are usual in Ireland, or were before this rebellion, five or fix other forts for to manure and improve the ground, where-of some are as good as the dung confisting of the excrements of beafts, and o-

thers do far surpass it. One of these sorts is ashes, and mud another.

As for the first, I have understood of Englishmen, who had lived many years in Ireland, and all that while had exercised husbandry, that they had used to gather all their ashes of their hearths, bake-houses, and brew-houses, being wood ashes, and to lay them of a heapsomewhere in the open air, from whence at convenient times they would carry them upon their grounds, and there spread them in the same manner as other dung, but nothing near in so great a quantity; wherein they affirmed to have found as much and more good than in any dung of beasts.

And I know several other English, who living in Ireland, diduse to take the scouring of their ditches, together with other mud digged out of the bogs, and having let it lye a good while a rotting in great heaps, did afterwards carry it upon their lands in lieu of dung: the which they found very good and useful

for that purpose.

These two sorts were never yet brought into common use, but only practifed by some sew persons, especially that of the ashes, although in other countries they have been known long since; so as Pliny, who lived about sisteen hundred years ago, writeth in the ninth chapter of the seventeenth book of his natural history, that in his time in that part of Italy which is situated between the Alpes and the river Po (comprehending those countries which now are known by the names of Piedmont and Lombardy) ashes were more used and commended for the manuring of the grounds, than the dung of beasts.

As concerning the burning of the heath, and other dry herbs standing upon the ground, for to manure the land with the ashes thereof, that not properly belonging to this place, shall be spoke of more at large in some of the ensuing

chapters.

SECT. VI. Of Lime.

THE English living in Queen's county in Leinster, having seen that in sundry parts of England and Wales, especially in Pembrookshire, lime was used by the inhabitants for the manuring and enriching of their grounds, begun some years since to practise the same, and found themselves so well thereby, that in a short time the use thereof grew very common amongst them, so as many of them ever after used no other kind of dung.

The manner of it was thus. Having first plowed their fields, they carried the lime on them, and laid it in many small heaps, leaving a convenient distance between, in the same manner as useth to be done with the dung of beasts; and having let them lye for some months, they plowed the land again to convey

the lime into the ground.

This made it so rich, that in a great while after nothing else needed to be done to it, but to let the land at a certain revolution of time lye fallow, no other manuring at all being requisite for some years after: and all that while the land was very fruitful, more than it could have been made with any ordinary dung, and very free of all forts of bad herbs and weeds (especially for the first years) bringing corn with much thinner husks than that growing upon other lands.

They found that the lime carried upon the land hot out of the kiln, did more good in all the forementioned particulars, than when they let it grow cold first. And this they could do very easily, because lime stone is very plentisul in that county, especially in the town of Montrath, where there is a whole hill of that stone, of that bigness, that if all the adjacent country did continually setch it from thence for the forenamed use, it would for ever hold out sufficiently.

The land thus manured and improved by lime, shewed its fruitfulness not only in the following years, but even in the first, except the lime had been laid on in undue proportion, and in greater quantity than was requisite; for in that case the lime burnt the corn, and the first years crop was thereby spoiled.

In some places where the land was not cold and moist enough to be able to endure mere lime, they mixed the lime with earth digged out of pits, and let

that stuff lye a mellowing in great heaps for some months together, and afterwards carried it on the land, and manured that therewith.

SECT. VII. A remarkable History concerning the Excellency of Lime for the enriching of the ground.

How incredibly the land was enriched by this kind of manuring, may be gathered by the ensuing particular, the whole lordship of Montrath was thirty years ago set by one Mr. Downings (whose it was, and who afterwards sold it to sir Charles Coot) for sifty pounds sterling by the year, and nevertheless after a while the farmers surrendred it unto him, complaining that they could not live by it but were quite impoverished: whereas they who sarmed it next after them (being people newly come out of England) and gave an hundred and sifty pounds sterling for it, did not only live very freely upon it, yea grew rich and wealthy, but withal did so far forth improve the land, partly indeed with building, planting, hedging, and the like, but chiefly by this kind of manuring, that at the time when this last horrible rebellion broke forth, the same lordship, if it had been to let out then, might have been let for five hundred pounds sterling a year: as it hath been assured me by some, who themselves had been farmers of that land.

SECT. VIII. Another History, shewing the Efficacy of Lime in this particular.

BEFORE we give over this discourse of lime, we shall add to what hath been faid already, that in some other parts of Ireland, where this manuring with lime was not used nor known, the vertue of lime in this particular hath been found out by mere chance. For some persons known to me, who lived but a few miles from Dublin, having understood that the crows (wherewith they were much plagued, and who did ule to make very great spoil of their grains) would not touch the corn wherewith the lime was mixed, did cause unflaked lime to be mingled with water, making it as thin as if it had been for the whitening of walls, and very well besprinkled the corn therewith, before it was carried to the fields to be fown, and that after this manner, the corn lying on a heap, one turned it with both hands, whilst another sprinkled on the foresaid stuff, doing so until the whole heap was thoroughly besprinkled; at other times they mingled dry lime with the corn, and afterwards besprinkled the whole heap with fair water through and through, for the same purpose, and hereby they did not only obtain the aforefaid end, of preserving the corn from the crows, but had thereby a fairer and better crop, than ever before their land had produced.

SECT. IX. Of Sea Sand.

LIME is much used in the province of Munster, as in other parts of Ireland, for to manure the ground withal, where the sea sand likewise is greatly used

to the same end, not only in places lying on the sea side, but even ten, twelve, and fisteen miles into the land, whither it was carried in some places by boats, and in others upon carts, the charges being sufficiently recompensed by the profit coming from it. For they used it for the most part only upon very poor land, consisting of cold clay, and that above half a foot deep: which land having been three or four times plowed and harrowed (in the same manner as is usual to be done with fallow) the sand is strowed all over very thinly, a little before the sowing time: the which being done, that land bringeth very good corn of all forts, not only rye and oats, but even barley and wheat, three years one after another; and having lain fallow the fourth year, for many years after it produceth very clean and sweet grass; whereas formerly, and before it was thus manured, it produced nothing but moss, heath, and short low surze: which herbs are fired upon the ground, and the ground stubbed, before it be plowed the first time.

It is not any peculiar fort of sea sand, nor out of any particular places, which is used for this purpose, but that which every where lyeth on the strands. And this manner of manuring the land with sea sand is very common in the two most westerly shires of England, Cornwal and Devonshire, from whence those,

who first practised it in Ireland, seem to have learned it.

SECT. X. Of Brine or Pickle.

The goodness of the sea sand consisteth chiefly in its saltness, for which reason pickle it self is very good for this purpose: it being very well known to several English dwelling about the Bann and Colrain, that were farmers of the salmon fishing there, who used every year carefully to keep the foul pickle, coming off the salmon at their repacking; and having poured it among the ordinary dung of cattle and straw they did let them lye a good while a mellowing together. Hereby it was greatly strengthened and enriched, so that the land being dunged with it, did bear much better and richer crops than that which was manured only with common dung without the mixture of it.

CHAP. XII.

SECT. I.

Of the Marl in Ireland, and the Manner of marling the Land there.

ARL is a certain fort of fat and clayish stuff, being as the grease of the earth; it hath from ancient times been greatly used for manuring of land both in France and England, as may appear out of Pliny in the sixth, seventh, and eighth chapters of his seventeenth Book. The same also

also is still very usual in sundry parts of England, being of an incomparable goodness: the which caused the English, who, out of some of those places where Marl was used, were come to live in Ireland, to make diligent search for it, and that with good success at last; it having been found out by them within these few years, in several places; first in the King's-county, not far from the Shannon, where being of a grey colour, it is digged out of the bogs; and in the county of Wexford, where the use of it was grown very common before this rebellion, especially in the parts lying near the sea; where it stood them in very good stead, the land of it self being nothing fruitful. For although the ground (for the most part) is a good black earth, yet the same being but one foot deep, and having underneath a crust of stiff yellow clay of half a foot; is thereby greatly impaired in its own goodness. In this depth of a foot and a half next under the clay, lieth the Marl, the which reacheth fo far downwards, that yet no where they are come to the bottom of it. It is of a blew colour, and very fat (which as in other ground, so in this, is chiefly perceived when it is wet) but brittle and dusty when it is dry.

SECT. II. The Manner, Charges, and Profit of marling the Ground.

after, many letting it lye several months ere they plow it again, that the rain may equally divide and mix it; the sun, moon, and air mellow and incorporate it with the earth. One thousand cart-loads of this goeth to one English acre of ground; it being very chargeable, for even to those who dig it out of their own ground, so as they are at no other expences but the hire of the labourers, every acre cometh to stand in three pounds sterling. But these great expences are sufficiently recompensed by the great fruitfulness which it causeth, being such, as may seem incredible; for the marled land, even the very first year, fully quitteth all the cost bestow'd on it. There besides it is sufficient once to marl, whereas the ordinary dunging must be renewed oftentimes.

SECT. III. The Usage of the marled Land, practised by them of the County of Wexford.

The good usage of the marled land, to keep it in heart for ever after, doth consist, in the opinion and practice of some, in letting it lye fallow at convenient times, but the ordinary manner, commonly practised by the inhabitants of the county of Wexford, and counted the best by them, is, that having sowed it five or six years together, with the richest forts of corn, to wit, wheat and barley (especially that fort which in some parts of England, and generally in Ireland, is peculiarly called bear, being a much richer grain than the ordinary barley) it being afterwards turned to pasture, whereunto it is very sit, for as such the sit bringeth very sweet grass in great abundance: for the marl is also used on meadows at the first, with very good success, improving the same most wonderfully.

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It the marled land be thus used, and by turns kept under corn, and grass, it keeps its fruitsulness for ever; where to the contrary, if year after year it be sowed till the heart be drawn out, it's quite spoiled, so as afterwards it is not possible to bring it again to any passable condition by any kind of dunging, or marling. This would ordinarily be done in the space of ten years; for so long together the marled land may be sowed, and bring every year a rich crop of the best corn.

Nevertheless this is not general, but taketh place only in the worser kind of ground; for where the land of it self is better and richer, there after marling, wheat and other corn may be sow'd, not only for ten years together, but longer: for very credible persons have assured me, that some parts of the county of Wexford having born very good corn for thirteen years together, and afterwards being turned to pasture, it was as good and fertile as other marled grounds that had been under corn but sive or six years.

SECT. IV. Of the Marl in Connaught.

The province of Connaught (by what hath been discover'd) is much more plentiful in marl, than Leinster, as in other counties, so in those of Roscommon, Slego, and Galloway, almost in every part of it. It is there of three several colours, some being white as chalk, other grey, and some black; but none blew, as that in the county of Wexford. It lieth nothing deep under the upper-ground, or surface of the earth, commonly not above half a foot; but its own depth is so great, that never any body yet digged to the bottom of it.

The land which they intend to marl in this province, is commonly plowed in the beginning of May, and lying five or fix weeks (until it be fufficiently dried and mellowed by the fun and wind) they harrow it, and then having brought the marl upon it, five or fix weeks after it is plowed again, and a third time about September: After which third plowing they fow it with wheat or barley, where-

of they have a very rich crop the next year.

SECT. v. Property and Usage of the marled Lands in Connaught.

LAND marled in that manner as we have faid, may be fowed ten or twelve years together; the first eight or nine with wheat, and bear, or barley, and the remaining three or four years with oats, afterwards the land is turned to pasture, and having serv'd some years in that kind, it may be marled anew, and made as

good for corn as at the first.

For the observation of those of the county of Wexford, that land may not be marled more than once, doth not take place in Connaught, where it is an ordinary thing, having some space of years to make it again. I know some gentlemen who have caused some parcels of land to be marled thrice in the space of twenty years, and have found very good profit by it. But whether this be caused by the difference of the ground and Marl (appearing also hereby, that in Con-

naught they scarce lay the fourth part of the quantity of Marl on the ground of what they do in the county of Wexford) or by the carelesness or want of experience of those of that county, I am not yet fully inform'd. But thus much is known as well in Connaught as other parts, that those who sow the marled land until it can bear no more, and be quite out of heart, will find it exceeding difficult, if not altogether impossible ever to amend or improve the same again by any means whatsoever.

CHAP. XIII.

Of the Heaths and Moors, or Bogs in Ireland.

SECT. I.

Of the moory, or boggy Heaths.

AVING spoke of the fruitful lands of Ireland, it followeth that we treat of those which are neither fit for the bringing of corn, or feeding of cattle; some being such for want of good soil, and others thro' superfluous moisture.

Of the first fort are those places where the ground consisting of mere rock, sand, or earth, naturally unfruitful hath no good mold at the top sufficient for corn or grass to root, and to draw convenient nourishment out of it, the ground being bare, or over-grown only with moss, heath, surze, brakes, thorns, ru-

shes, and the like.

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The places whose ground is bare, are nothing frequent, nor of any great bigness in Ireland, and rather on the sea side than within the land. But the other are very common throughout the whole kingdom, not only in the mountains (many whereof do for the most part consist of nothing else) but also in the hilly quarters, the plain countries, and in many places of great extent, taking up some miles in length and breadth. Most of these wastes in the plain countries and valleys, as also some on the mountains and hills, are moory and boggy, fit for to dig turf out, to the great commodity of the inhabitants, in places where other fuel is wanting. So that these parts of land, although barren and producing no kind of thing for the food of man or beafts, may not be reckoned in the number of those which are altogether unprofitable, being of good use in the parts far distant from the sea, where they can have no sea coals, and where woods are wanting, nor well live. Some of these dry, or red bogs, as commonly they are called (the first, in comparison of those whereof presently shall be spoken, the other, because the earth in them for the most part is reddish, and overgrown with moss of the same colour) are in some parts of a valt extent; instance that by the Shannon side, beginning hard by Athlone, and following the course of the river down towards Limerick, which being two or three miles broad in most parts, is said to be upwards of fifty miles in length.

SECT. II. Of the dry Heaths.

THERE are some dry heaths in Ireland, for the most part on the mountains, and very sew in the plain countries; to the contrary of England, where, as well as in Netherland, Germany, and other countries, those heaths on plain ground are very common in sundry parts of the land, and many of them of a great extent, having very many miles in compass; and where any such dry heaths are in Ireland, the land for the most part is not altogether barren, but grassy between and at the bottom of the heath; so as the heath being burnt (a thing much used in Ireland both by the English and Irish) the land bringeth reasonable good and sweet grass, fit for sheep to feed on; and with a little ex-

traordinary labour and costs brought to bear corn.

Others of these heaths are grassy, having the grass growing not all over among the heath, but in spaces by it self: as upon the heath between the town of Kildare and the Listy; which is famous over all Ireland by the name of the Currough of Kildare, being a hilly ground, at its highest near the said town, from thence towards the Listy descending by degrees, about three miles long, and two or three broad, divided into rows, of heath and grass; which being of no great breadth, and many in number, do lye by the side one of another throughout the whole earth, each of those rows extending it self in length from the one end of the Currough to the other, the rows of heath are about a stone cast over in some places, in some more, in others less: but those of grass a good deal narrower than the others, being always alike green and dry, in the winter as well as the summer, and cloathed with short grass, but very sweet and good, very convenient for sheep to feed on; of the which always in time of peace, a very great number is grazing here, the whole Currough being a common.

SECT. III. Of the wet Bogs.

The places barren through superfluous moisture, are bogs called by the Irish Moones, whereof Ireland is full. There is three or four different sorts of them; grassy, watry, muddy, and hassocky, as appeareth more largely by the following description. But the English Irish have given the name of bogs, not only to the wet, of which we are now to treat, but as well to the turf moors of all sorts, not excepting the red bog, which in most places is firm enough to bear a man, or unshod nagge going over it, but is not for any great weight. But we shall in the following chapters speak in order of the four sorts of wetbogs, which above we have mentioned, and afterwards in its due place treat of the turt and red moors, as occasion shall require.

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SECT. IV. Of the graffy Bogs.

The graffy bogs are all over covered with grafs, looking fair and pleafant, as if they were dry ground and goodly meadows; whereby many, who not knowing the nature of those places, and because of the greenness suspecting no evil, go into them to their great trouble, and many times to the extreme danger of their lives, for the earth being very spungy can bear no weight, but as well men as beasts, as soon as they set foot on it do sink to the ground, some knee deep, others to the waste, and many over head and ears: for all or most bogs in Ireland having underneath a hard and firm gravel are not of an equal depth, which in some is only of two or three feet, in others five, six or more, insomuch that those who sall into the deepest places of these bogs, can hardly escape, but for the most part do perish, being pitifully smothered.

Some of these bogs do so dry up in the summer that they may be passed without danger; the which in particular falleth out in the great mountains in Munster in the county of Kerry, called Slew Logher, upon which all kind of cattle do graze the summer long being every where full of good and sweet grass, knee deep in most places; whereof not the tenth part being eaten (for if all the cattle of that province were driven thither and left all the summer upon the place it would hardly be consumed) the rest is spoiled when the wet weather cometh in, and stayeth the rain water from descending; through which the ground rotteth in that manner, that all winter long it is unpassable for men and

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But the deepest bogs are unpassable in the summer as well as in the winter, yet most of them have firm places, in narrow paths, and in some larger parcels; by the means whereof those, unto whom they are known, can cross them from one side to another, where others who are not used to them do not know in what part to set one step; in which nimble trick, called commonly treading of the bogs, most Irish are very expert, as having been trained up in it from their infancy.

The firm places in passing, or but lightly shaking them, tremble for a great way, which hath given them the name of shaking bogs; and where they are

but of a imall compass, quagmires.

SECT. v. Of the watry Bogs, and of the miry Bogs.

THE watry bogs are likewise clothed with grass, but the water doth not sink altogether into them, as into the former, but remaineth in part standing on the top (in the same manner as in some of the grassy bogs, and in all the low pastures and meadows of Holland) by reason whereof these bogs are not dangerous; for every one at the first sight may easily discern them from the firm ground.

These two sorts are in many parts found apart, and in others mix'd and interlaced; and likewise parcels both of the one and the other are found up and down in the moory heaths and red bogs.

Both these sorts, as well the watry as the green bogs, yield for the most part very good turf, much better than the red bogs, whereof more shall be spoken

hereafter.

The miry bogs do confist of mere mud and mire, with very little or no grass upon them. These are commonly of a very small compass, whereas most part of the other two are of a notable extent, and some of several miles in length and breadth.

SECT. VI. Of the hasfocky Bogs.

HASSOCKY bogs we call those, whose ground being miry and muddy 18 covered over with water a foot or two deep, in some places more, in others less; fo as one would sooner take them for loughs, were it not that they are very thick overspread with little tufts or islets, the which confisting of reeds, rushes, high fowre grafs, and fometimes with little shrubs, for the most part are very small, and have but a tew feet in compals; some of them being of the bigness of a reafonable big chamber. These little islets or tufts being so many in number, and spread over all the bog, there remaineth nothing between them but great plashes of water (in regard whereof these bogs might well be called plashy bogs) in some places wider, in others narrower, so as from the one, men may well step or leap to the other; that which those who are expert in it know how to do very nimble, and so to run from one part of the bog to another: for the roots of the rushes, reeds, and other things growing on those tusts, are so interwoven, that they can eafily bear a man who lightly treadeth upon them, altho' they have very little earth, and are wondrous spungy; so as they, when the water being drained, the bog is dried round about, may easily be pluck'd from the ground.

The English inhabiting in Ireland have given these tusts the name of halsocks, and this fort of bogs, hassocky bogs: of which bogs Munster and other provinces are not altogether free, but most of them are found in Leinster, especially in King's and Queen's-county, where also the other sorts of bogs are very common; whereas otherwise Connaught is generally fuller of bogs than

any of the other provinces.

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CHAP. XIV.

Original of the bogs in Ireland; and the Manner of draining them practifed there by the English Inhabitants.

SECT. I.

Of the Original of Bogs in this Country.

TERY few of the wet bogs in Ireland are such by any natural property, or primitive constitution, but through the superfluous moisture that in length of time hath been gathered therein, whether it have its original within the place it self, or become thither from without. The first of these two cases taketh place in the most part of the grassy bogs, which ordinarily are occasion'd by springs; the which arising in great number out of some parcel of ground, and finding no issue, do by degrees soak through, and bring it to that rottenness and spunginess, which nevertheless is not a little encreased through the rain water coming to that of the springs.

But the two other forts, viz. the watry and hasfocky bogs, are in some places caused by the rain water only, as in others thro' brooks and rivulets running into them, and in some thro' both together; whereunto many times also cometh the cause of the grassy bogs, to wit, the store of springs within the very ground: and all this in places, where or through the situation of them, and by reason of their even plainness or hollowness, or through some other impediment, the water hath no free passage away, but remaineth within them, and

fo by degrees turneth them into bogs.

SECT. II. Retchlessness of the Irish, Cause of most of the Bogs. Of Trees found in Bogs.

So that it may easily be comprehended, that whoso could drain the water, and for the future prevent the gathering thereof, might reduce most of the bogs in Ireland to firm land, and preserve them in that condition. But this hath never been known to the Irish, or if it was, they never went about it, but to the contrary let daily more and more of their good land grow boggy through their carelesness, whereby also most of the bogs at first were caused.

This being otherwise evident enough, may further be confirm'd by the whole bodies of trees, which ordinarily are found by the turf diggers very deep in the ground, as well of other trees, as of hazels: likewise they meet sometimes with the very nuts themselves in great quantity, the which looking very fair and whole

whole at the outfide, as if they came but newly from the tree, have no kernel within the same, through the great length of time being consumed and turned into filth.

And it is worthy of observation, that trees, and trunks of trees, are in this manner found not only in the wet bogs, but even in the heathy ones or red bogs, as by name in that by the Shannon side, whereof hath been spoken above: in which bog the turf diggers many times do find whole fir trees deep in the ground; whether it be that those trees, being fallen, are by degrees sunk deeper and deeper (the earth of that bog almost every where being very loose and spungy, as it is in all such bogs) or that the earth in length of time be grown over them.

SECT. III. Draining of the Bogs practifed by the English in Ireland.

Bur as the Irish have been extreme careless in this, so the English, introducers of all good things in Ireland (for which that brutish nation from time to time hath rewarded them with unthankfulness, hatred, and envy, and lately with a horrible and bloody conspiracy, tending to their utter destruction) have fet their industry at work for to remedy it, and having considered the nature of the bogs, and how possible it was to reduce many of them unto good land, did some years since begin to go about it all over the land, and that with very good fuccels; so as I know gentlemen, who turn'd into firm land three or four hundred acres of bog, and in case that this detestable rebellion had not come between, in a few years there would scarce have been left one acre of bog, of what was in the lands and possession of the English; except only those places whose situation is altogether repugnant to draining, because that the water either through the hollowness of the place, as in the inclosed vallies and deep dales between the hills and mountains, or through the too great evenness and plainness of the ground, not inclining to any one part more than another, cannot be drawn away at all; and except fuch parcels as needs must have been kept turf, and red bogs who are very unfit for draining, for the trenches being made, the earth on both fides will fink into them again, and choak them up.

SECT. IV. Profit reap'd by the draining of Bogs.

This draining of the bogs as it tended not a little to the general good of the whole land, by amending of the air (whereof we shall have occasion to say more in some other place) and otherwise, so it brought great profit unto the authors, for the land or soil of the bogs being in most places good of it self, and there besides greatly enriched by the lying still and the soaking in of the water for the space of so many years, the same being dried through the draining of the water, is found to be very sit either to have corn sowed upon, or to be turn'd into pastures; making also excellent meadows: so as those, who have tried that, do affirm, that the meadows gain'd out of the bogs might be compared with the very best of their other meadows, yea many times surpassed the same in goodness: and this took place chiefly in the grassy bogs or shaking bogs, whose

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fruitfulness in this particular, and in the plentiful production of very sweet and deep grass, after the draining off the water, was very wonderful; and all this without any other trouble or costs bestowed upon these meadows, than that they dunged them the first year, to warm them the better and the sooner, and more thoroughly to amend the remainders of that coldness and rawness contracted through that long and constant continuance of the water upon them; after which once dunging, afterwards for a good many years nothing else needed to be done to them.

SECT. v. The Manner of draining the Bogs.

This draining of the bogs was performed in the manner following. On that fide of the bog, where the ground was somewhat sloping, they cut a broad deep trench, beginning it in the firm ground, and advancing it unto the entrance of the bog, into which trench the water would fink out of the next parts of the bog in great abundance, and that many times so suddenly, as if a great fluice had been opened, so as the labourers were constrained to run out of it with all speed, less the force of the water should overwhelm and carry them away. Some part of the bog being by this means grown reasonably dry within a short space of time, opportunity thereby was ministred to advance the trench further into the bog; and so by little and little they went on with it until at last they carry'd it quite across the bog, from the one side to the other: and having done this, they made a great many lesser trenches out of the main one, on both sides of the same; the which bringing the water from all the parts of the bog unto the main trench, did in a little while empty the bog of all its superstuous moisture, and turn it into good and firm ground.

SECT. VI. Observation about the Falling and Settling of the Bogs at their Draining.

THE green or graffy bogs, the which having all their moisture and water inwardly, are thereby wonderfully swelled and puft up, use by means of this draining to fall very much, and to grow a great deal lower, and that not only apparently, so that the ground which before the draining was five or fix feet high, cometh at last to be not above two or three feet high; but sometimes also suddenly, and within the space of four and twenty, or eight and forty hours; whereas ordinarily that useth to come to pass in greater length of time; and although the ground by falling in this manner, may seem thereby to have been subject to return to its former boggy condition on the least occasion; nevertheless there was no danger of that, as long as the trenches were kept open, and thereby the passage kept free for the water, which from time to time would from all parts of the drained bog be finking into them. This water, as at the first draining, so ever after, was by the main trench carry'd unto some brook, river, or lough, according as one or other of them was next at hand, and the situation of the land would give opportunity. CHAP.

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CHAP. XV.

Of the Woods in Ireland.

SECT. I.

Woods in Ireland are reckon'd among the barren Lands, and the Reason thereof.

Mongst the barren parts of Ireland the woods must also be counted, according to the usual division of the lands of that kingdom, whereby reckoning for fruitful only the meadows, arable grounds, and pastures, they count all the rest for barren, comprehending them under these three general heads, bogs, barren mountains, and woods. Which division as it is in the mouth of all them that have any insight into the matters of that land, and do, or have lived there, so it is further confirmed by a number of writings and monuments, both of ancient times, and late ones, in the which it is very common and samiliar: as for instance may appear by those several acts, which since this last rebellion of the Irish have been made by the parliament of England in the behalf of the adventurers who have laid out their mony for the reconquering of the revolted parts of that kingdom.

For although the land which the woods do take up, is in it self very good in most places, and apt to bear both corn and grass plentifully (whereof more shall be said by and by) yet as long as the woods remain standing, it is unsit not only to be made either arable or meadow (as in it self is most evident) but even for pasture, by reason of the overmuch moisture, the roots of the trees staying the rain water, so as it hath not the liberty to pass away readily, and their stems and branches hindering the free access of the wind and sun, whereunto cometh in many parts the ground's own watriness, occasioned by springs there arising, and by its situation apt for the gathering and keeping of water, which maketh them for the most part so muddy and boggy, that cattle cannot conveniently

feed in them.

SECT. II. Woods much diminished in Ireland since the first coming in of the English.

In ancient times, and as long as the land was in the full possession of the Irish themselves, all Ireland was very full of woods on every side, as evidently appeareth by the writings of Giraldus Cambrensis, who came into Ireland upon the first conquest, in the company of Henry II. king of England, in the year of our savious

faviour 1171. But the English having settled themselves in the land, did by degrees greatly diminish the woods in all the places where they were masters, partly to deprive the thieves and rogues, who used to lurk in the woods in great numbers, of their refuge and starting-holes, and partly to gain the greater scope of profitable lands. For the trees being cut down, the roots stubbed up, and the land used and tilled according to exigency, the woods in most part of Ireland may be reduced not only to very good pastures, but also to excellent arable and meadow.

Through these two causes it is come to pass in the space of many years, year of some ages, that a great part of the woods, which the English found in Ireland at their first arrival there, are quite destroyed, so as nothing at all remain-

eth of them at this time.

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SECT. III. Diminishing of the Woods during the last peace.

AND even fince the subduing of the last great rebellion of the Irish before this, under the conduct of the earl of Tirone (overthrown in the last years of queen Elizabeth by her viceroy fir Charles Blunt, lord Mountjoy, and afterwards earl of Devonshire) and during this last peace of about forty years (the longest that Ireland ever enjoy'd, both before and fince the coming in of the English) the remaining woods have very much been diminished, and in sundry places quite destroyed, partly for the reason last mentioned, and partly for the wood and timber itself, not for the ordinary uses of building and firing (the which ever having been a-foot, are not very confiderable in regard of what now we speak of) but to make merchandize of, and for the making of charcoal for the ironworks. As for the first, I have not heard that great timber hath ever been used to be sent out of Ireland in any great quantity, nor in any ordinary way of traffick; but only pipe-staves, and the like, of which good store hath been used to be made, and fent out of the land, even in former times, but never in that vast quantity, nor so constantly as of late years, and during the last peace, wherein it was grown one of the ordinary merchantable commodities of the country, so as a mighty trade was driven in them, and whole ship-loads sent into foreign countries yearly; which as it brought great profit to the proprietaries, so the felling of so many thousands of trees every year as were employed that way, did make a great destruction of the woods in tract of time. As for the charcoal, it is incredible what quantity thereof is consumed by one iron-work in a year: and whereas there was never an iron-work in Ireland before, there hath been a very great number of them erected fince the last peace in fundry parts of every province: the which to furnish constantly with charcoals, it was necessary from time to time to fell an infinite number of trees, all the loppings and windfals being not sufficient for it in the least manner.

SECT. IV. Great part of Ireland very bare of Woods at this time.

THROUGH the aforesaid causes Ireland hath been made to bare of woods in many parts, that the inhabitants do not only want wood for firing (being there-

therefore constrained to make shift with turf, or sea-coal, where they are not too far from the sea) but even timber for building, so as they are necessitated to setch it a good way off, to their great charges, especially in places where it must be brought by land: and in some parts you may travel whole days long without seeing any woods or trees except a sew about gentlemens houses; as namely from Dublin, and from places that are some miles further to the south of it, to Tredagh, Dundalk, the Newry, and as far as Dromore; in which whole extent of land, being above threescore miles, one doth not come near any woods worth the speaking of, and in some parts thereof you shall not see so much as one tree in many miles. For the great woods which the maps do represent unto us upon the mountains between Dundalk and the Newry, are quite vanished, there being nothing lest of them these many years since, but one only tree, standing close by the highway, at the very top of one of the mountains, so as it may be seen a great way off, and therefore serveth travellers for a mark.

SECT. V. Many great Woods still left in Ireland.

YET notwithstanding the great destruction of the woods in Ireland, occasioned by the aforesaid causes, there are still sundry great woods remaining, and that not only in the other provinces, but even in Leinster it self. For the country of Wicklow, King's-country, and Queen's-country, all three in that province, are throughout sull of woods, some whereof are many miles long and broad. And part of the counties of Wexford and Carlow are likewise greatly surnished with them.

In Ulster there be great forests in the county of Dunnagal, and in the north part of Tyrone, in the country called Glankankin. Also in the county of Fermanagh, along Lough Earn; in the country of Antrim; and in the north part of the county of Down; in the two countries called Killultagh and Kilwarlin; besides several other lesser woods in sundry parts of that province. But the country of Louth, and far the greatest part of the counties of Down, Ardmagh, Monaghan, and Cavan (all in the same province of Ulster) are almost every where bare, not only of woods, but of all sorts of trees, even in places which in the beginning of this present age, in the war with Tyrone, were encumbred with great and thick forests.

In Munster where the English, especially the earl of Cork, have made great havock of the woods during the last peace, there be still sundry great forests remaining in the counties of Kerry, and of Tipperary; and even in the county of Cork, where the greatest destruction thereof hath been made, some great woods are yet remaining, there being also store of scattered woods both in that

county, and all the province over.

Connaught is well stored with trees in most parts, but hath very few forests or great woods, except in the counties of Mayo and Slego.

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CHAP. XVI.

Of the Mines in Ireland, and in particular of the Iron-mines.

SECT. I.

All the Mines in Ireland discovered by the New-English.

HE Old-English in Ireland, that is, those who are come in from the time of the first conquest, until the beginning of queen Elizabeth's reign, have been so plagued with wars from time to time, one while intestine among themselves, and another while with the Irish, that they could scarce ever find the opportunity of seeking for mines, and searching out the metals hidden in the bowels of the earth. And the Irish themselves, as being one of the most barbarous nations of the whole earth, have at all times been so far from feeking out any, that even in these last years, and since the English have begun to discover some, none of them all, great nor small, at any time hath applied himself to that business, or in the least manner furthered it.

So that all the mines which to this day are found out in Ireland, have been discovered (at least as for to make any use of them) by the New-English, that is, fuch as are come in during, and fince the reign of queen Elizabeth. Several whereof having begun to give their minds to it during the last peace, have in a few years found out a great many iron-mines in fundry parts of the kingdom, and also some of lead and filver; which greatly confirmeth the opinion of many knowing persons, who hold that the mountains of Ireland are full of metals, and that if the same industry and diligence had been used by the inhabitants of that country in former ages, as there hath been fince the beginning of the prefent, many more mines might have been discovered, not only of the same minerals as have been found out hitherto, but of others also, and perhaps even of gold it felf.

SECT. II. Grounds to believe that there are Gold-mines in Ireland.

I believe many will think it very unlikely, that there should be any goldmines in Ireland; but a credible person hath given me to understand, that one of his acquaintance had several times assured him, that out of a certain rivulet in the county of nether-Tyrone, called Miola (the which rifing in the mountains Slew-galen, and paffing by the village Maharry, falleth into the northwest corner of Lough Neagh, close by the place where the river Bann

cometh out of it) he had gathered about one dram of pure gold; concluding thereby, that in the aforesaid mountains rich gold mines do lye hidden.

For it is an ordinary thing for rivers, which take their original ingold-bearing mountains, to carry gold mixt with their fand; the which may be confirmed by many initances, and to say nothing of several rivers of that kind, mentioned by Strabo, Pliny, and other old geographers and historians, nor of Pactolus and Hermus in Lydia, and Tagus in Spain, whereof all the old poets are full; it is certain, that in our very times several rivers in germanie, as the Elbe, Schwarts, Sala, and others, do carry gold, and have it mix'd with their sands; out of the which by the industry of man it is collected.

SECT. III. Three forts of Iron-mines in Ireland: and first of the first sort,
Bog-mine.

But to let alone uncertain conjectures, and to content our selves with the mines that are already discovered, we will in order speak of them, and begin with the iron-mines. Of them there are three forts in Ireland, for in some places the oar of the iron is drawn out of moores and bogs, in others it is hewen out of rocks, and in others it is digged out of mountains: of which three sorts the first is called bog-mine, the other rock-mine, and the third with several names

white-mine, pin-mine, and shel-mine.

The first sort, as we have said, and as the name it self doth shew, is found in low and boggie places, out of the which it is raised with very little charge, as lying not deep at all, commonly on the superficies of the earth, and about a foot in thickness. This oar is very rich of metal, and that very good and tough, nevertheless in the melting it must be mingled with some of the mine or oar of some of the other sorts: for else it is too harsh, and keeping the surnace too hot, it melteth too suddenly, and stoppeth the mouth of the surnace, or, to use the workmens own expression choaketh the surnace. Whilest this oar is new, it is of a yellowish colour, and the substance of it somewhat like unto clay, but if you let it lye any long time in the open air, it groweth not only very dry, as the clay useth to do, but moldereth and dissolveth of it self, and talleth quite to dust or sand, and that of a blackish or black-brown colour.

SECT. IV. Of the second fort of Iron-mine, called Rock-mine.

The second fort, that which is taken out of rocks, being a hard and meer stony substance, of a dark and rustie colour, doth not lye scattered in several places, but is a piece of the very rock, of the which it is hewen: which rock being covered over with earth, is within equally every where of the same substance; so as the whole rock, and every parcel thereof, is oar of iron. This mine, as well as the former is raised with little trouble, for the iron-rock being sull of joints, is with pick-axes easily divided and broken into pieces of what bigness one will: which by reason of the same joints, whereof they are sull every where, may easily be broke into other lesser pieces, as that is necessary, before they be put into the surnace.

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This mine or oar is not altogether fo rich as the bog-mine, and yieldeth very brittle iron, hardly fit for any thing else, but to make plow-shares of it (from whence the name of colt-share iron is given unto it) and therefore is seldom

melted alone, but mixed with the first of the third fort.

Chap. XVI.

Of this kind hitherto there hath but two mines been discovered in Ireland, the one in Munster, near the town of Tallow, by the earl of Cork's iron works; the other in Leinster, in King's-county, in a place called Desart land, belonging to one serjeant major Piggot, which rock is of so great a compass, that before this rebellion it surnished divers great iron-works, and could have surnished many more, without any notable diminution; seeing the deepest pits that had been yet made in it, were not above two yards deep. The land, under which this rock lieth, is very good and fruitful, as much as any other land thereabouts, the mold being generally two seet and two and a half, and in many places three feet deep.

SECT. v. Of the third fort of Iron-mine

The third fort of Iron-mine is digg'd out of the mountains, in several parts of the kingdom; in Ulster, in the county of Fermanagh, upon Lough Earn; in the county of Cavan, in a place called Doubally, in a dry mountain; and in the county of nether-Tyrone, by the side of the rivulet Lishan, not far from Lough Neagh; at the foot of the mountains Slew-galen mentioned by us upon another occasion, in the beginning of this chapter: in Leinster, in King's-county, hard by Mountmelick; and in Queen's-county, two miles from Montrath: in Connaught; in Tomound or the county of Clare, six miles from Limerick; in the county of Roscommon, by the side of Lough Allen; and in the county of Leitrim, on the east side of the said lough, where the mountains are so full of this metal, that thereof it hath got in Irish the name of Slew Neren, that is, mountains of iron: and in the province of Munster also in sundry places.

This fort is of a whitish or grey colour, like that of ashes; and one needs not take much pains for to find it out, for the mountains which do contain it within themselves, do commonly shew it of their own accord, so as one may see the veins thereof at the very outside in the sides of the mountains, being not very broad, but of great length, and commonly divers in one place, sive or six ridges

the one above the other, with ridges of earth between them.

These veins or ridges are vulgarly called pins, from whence the mine hath the name of pin-mine; being also called white-mine, because of its whitish colour; and shell-mine, for the following reason: for this stuff or oar being neither loose or soft as earth or clay, neither firm and hard as stone, is of a middle substance between both, somewhat like unto slate, composed of shells or scales, the which do lye one upon another, and may be separated and taken as under very easily, without any great force or trouble. This stuff is digged out of the ground in lumps of the bigness of a man's head, bigger, or less, according as the vein affordeth opportunity. Within every one of these lumps, when the

mine

mine is very rich and of the best sort (for all the oar of this kind is not of equal goodness, some yielding more and better iron than other) lieth a small kernel, which hath the name of hony-comb given to it, because it is full of little holes, in the same manner as that substance whereof it borroweth its appellation.

The iron coming of this oar is not brittle, as that of the rock-mine, but

tough, and in many places as good as any Spanish iron.

SECT. VI. Iron-works erected by the English.

THE English having discovered these mines, endeavoured to improve the same, and to make profit of them, and consequently several iron-works were erected by them in sundry parts of the land, as namely by the earl of Cork in divers places in Munster; by sir Charles Coot in the counties of Roscommon and Letrim, in Connaught, and in Leinster by Montrath, in Queen's-county; by the earl of Londonderry at Ballonakill, in the said county; by the lord chancellor sir Adam Lostus, viscount of Ely, at Mountmelick, in King's-county; by sir John Dunbar in Fermanagh, in Ulster; and another in the same county, by the side of Lough Earn, by sir Leonard Bleverhasset; in the county of Tomond, in Connaught, by some London merchants; besides some other works in other places, whose first erectors have not come to my knowledge.

In imitation of these have also been erected divers iron-works in sundry parts of the sea coast of Ulster and Munster, by persons, who having no mines upon or near their own lands, had the oar brought unto them by sea out of England; the which they sound better cheap than if they had caused it to be setch'd by land from some of the mines within the land. And all this by English, whose industry herein the Irish have been so far from imitating, as since the beginning of this rebellion they have broke down and quite demolished almost all the forementioned iron-works, as well those of the one as of the other fort.

CHAP. XVII.

Of the Iron-works; their Fashion, Charges of erecting and maintaining them, and Profit coming of them: With an exact Description of the Manner of melting the Iron in them.

SECT. I.

The Fashion of the Iron-works.

HE fashion of the iron-works, of whose erection we have spoke in the end of the foregoing chapter, is such as followeth. At the end of a great barn standeth a huge furnace, being of the height of a pike and a half, or more, and sour-square in figure, but after the manner of a malt-

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kiln, that is narrow below, and by degrees growing wider towards the top, so as the compass of the mouth or the top is of many fathoms. This mouth is not covered, but open all over; so that the flame, when the furnace is kindled, rising through the same without any hindrance, may be seen a great way off in the night, and in the midst of the darkness maketh a terrible shew to travellers,

who do not know what it is.

These ovens are not kindled with wood, nor with sea-coal, but merely with charcoal, whereof therefore they consume a huge quantity: for the surnace being once kindled, is never suffered to go out, but is continually kept a burning from the one end of the year to the other: and the proportion of the coals to the oar is very great: for the mine would not melt without an exceeding hot fire; the which that it may be the more quick and violent, it is continually blown day and night without ceasing by two vast pair of bellows, the which resting upon main pieces of timber, and with their pipes placed into one of the sides of the surnace, are perpetually kept in action by the means of a great wheel, which being driven about by a little brook or water-course, maketh them rise and fall by turns, so that whilst the one pair of bellows doth swell and fill it self with wind, the other doth blow the same forth into the surnace.

SECT. II. Of the lesser Iron-works, called Bloomeries: Of the Hammer-works:

And of the Casting-works.

THERE is another and lesser fort of iron-works, much different from the former: for instead of a surnace they use a hearth therein, altogether of the sa-shion of a smith's hearth, whereon the oar being laid in a great heap, it is covered over with abundance of charcoal, the which being kindled, is continually blown by bellows that are moved by wheels and water-courses, in the same manner as in the other works.

These works, commonly called bloomeries, are in use, or were so before this

rebellion in fundry places of the north parts of Ulster.

Besides these two sorts of works, where the iron-mine is melted, there is a third sort, where the iron after the first melting is hammer'd out into bars, of which we shall have occasion to speak more in the latter end of this present

chapter.

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There were also in some parts of Ireland yet another kind of iron-works differing from all the former, where the iron was cast into ordnance, pots, small round surnaces, and other things; of which works Mr. Christopher Wandsworth, master of the rolls of Ireland, and in his latter days lord deputy of the same kingdom under the earl of Strafford, then lord lieutenant thereof, had one upon his lands by Idough in the county of Carlow; whereof we cannot give the reader any particulars, because we have not yet been informed thereof.

SECT. III. Conveniencies requisite to the erecting of an Iron-work.

In the erecting of these works men seek to make them as near to the mine as may be, to get the more profit by them: for the greater the distance is, the K greater

greater are the charges in having the oar brought from the mine to the furnace, especially where all must be carried by land, the which doth fall out so

in far the most places.

But many times one is necessitated to make the works a good way further from the mine, than otherwise one would, because of the water courses, the which being of very great consequence in the well settling of a work, and absolutely necessary (the wheels being all moved by water) those places must be made choice of, where one may have the conveniency of water-courses. And besides all this, regard must be had to the nearness of the woods, partly by reason of the timber, a great deal whereof is necessary for the erecting of one of these works, and chiefly for the char-coals sake, of which a vast quantity continually is requisite, as before we have shewed.

SECT. IV. The charges of erecting and maintaining an Iron-work.

IT is to be observed, that although there be wood enough upon ones land, and that not very far from the mine, together with the conveniences of watercourses, so as the water needeth not to be brought from very far off, nevertheless the charge is very great, both of erecting and stocking one of the ironworks, and of maintaining it and keeping it afoot, and that by reason of the great number of workmen and labourers of feveral forts, which thereunto is requisite; a list of whose names and offices here followeth: wood-cutters, who fell the timber; fawyers, to faw the timber; carpenters, smiths, masons, and bellow-makers, to erect the iron-works, with all the appurtenances thereof, and to repair them from time to time; water-leaders, or water-course-keepers, to steer the water-courses, and to look to them constantly; basket-makers, to make baskets for to carry the oar and other materials; boat-men, and boat-wright to make the boats, and to go in them; diggers, who work in the mine, and dig the same; carriers, who carry the oar from the mine; colliers, who make the char-coal; corders, who bring the char-coal to the work; fillers, whole work it is from time to time to put the mine and the coals into the furnace; keepers of the furnace, who look to the main work, rake out the ashes and cinders, and let out the molten metal at convenient times; finers, who look the works where the iron is hammered; hammerers, whose work is to see the iron hammered out: besides several other labourers, who having no particular task, must help to put their hand to every thing: of all which forts of men Charles Coot the elder, that zealous and famous warriour in this present wark gainst the Irish rebels (wherein having done many memorable exploits, he los his life in the first year thereof) did continually keep at work some five an twenty or fix and twenty hundred, at his iron-works, being three in number Whereby may eafily be gathered the greatness of the expences in erecting an maintaining of iron-works: and for all this the owners thereof did greatly ga thereby, ordinarily no less than forty in the hundred per annum.

SECT. v. Of the profit of the Iron-works instanced in those of Sir Charles Coot by Mountrath.

To speak somewhat more particularly both of the charges and profits of these iron-works, we shall instance the matter in one of the works of the said sir Charles Coot, namely that which he had in the lordship of Mountrath, in Queenscounty. At that work the tun (that is twenty hundred weight) of rockmine at the surnace head came in all to stand in five shillings six pence sterling, and the tun of white-mine, which he had brought him from a place two miles surther off in seven shillings. These two were mixed in that proportion, that to one part of rock-mine were taken two parts of white-mine: for is more of the rock-mine had been taken, the iron would not have been so good, and too brittle; and being thus mixed, they yielded one third part of iron: that is to say, of two tuns of white-mine, and one of rock-mine, being mingled and melted together, they had one tun of good iron, such as is called merchants-iron, being not of the first, but second melting, and hammered out into bars, and consequently sit for all kinds of use.

This iron he fent down the river Oure (by others called the Nure) to Rosse and Waterford in that kind of Irish boats which are called cots in that country, being made of one piece of timber: which kind of ill favoured boats (mentioned also by us above) are very common throughout all Ireland, both for to pass rivers in, and to carry goods from one place to another; and not only upon shallow waters, such as the aforenamed river is in the greatest part of its

course, but even upon the great rivers and loughs.

At Waterford the iron was put aboard of ships going for London, where it was sold for sixteen, otherwhiles for seventeen pounds sterling, and sometimes for seventeen and a half; whereas it did not stand fir Charles Coot in more than betwixt ten and eleven pounds sterling, all charges reckoned, as well of digging, melting, sining, as of carrying, boat-hire, and freight, even the custom also comprehended in it.

SECT. VI. Some other particulars about the same subject, of the profit of the Iron-works.

In most of the other places did a tun of the iron-mine or oar come to stand in five, five and a half, and six shillings sterling at the surnace head; and it was an ordinary thing, as well where they used white-mine, as where they mixed rock-mine with it, to have a tun of good iron out of three tuns of oar: in some places, where the mine was richer, they would have a tun of iron out of only two tuns and a half of oar. Nevertheless sew of them gained more or as much as sir Charles Coot, because they had not the same conveniency of transportation: And he himself did not guin so much by his iron-works in Connaught, as by that near Mountrath, although the mines there afforded a richer oar, and that the tun thereof did cost him but three shillings at the surnace K 2

because that Lough-Allen, whereunto the same mines and works are contiguous, gave him the opportunity of carrying the oar by water from the mine un-

The earl of Cork whose iron-works being seated in Munster, afforded unto him very good opportunity of sending his iron out of the land by shipping, did in this particular surpass all others, so as he hath gained great treasures thereby: and knowing persons, who have had a particular insight into his affairs, do assure me, that he hath profited above one hundred thousand pounds clear gain by his said iron-works.

SECT. VII. The manner of melting the Iron-oar.

The manner of melting the iron, usual in Ireland, is thus. The surnace is not filled to the top, but some space is lest empty, and to put new stuffinto it they do not stay until the former be quite consumed, but only until it be some what descended, and then they cast into it some charges or basketfuls of coals, and at the top of them the same quantity of mine: and thus they do from time to time, so as the surnace is in a manner always in one and the same estate; where is to be observed, that in most surnaces they add unto the oar and coals some quantity of iron-cinders, and in others of lime-stone, whereby the melting of the iron is greatly surthered, and the surnace made to work more mildly.

Within the barn, at the bottom of the furnace, stand constantly two men, one of each side, the which with long iron hooks, through holes left for the purpose, do every quarter of an hour draw out the unburnt coals, ashes, and cinders; which cinders are great lumps of a firm substance, but brittle, of a blackish colour, shining, but not transparent; being nothing else but the remainder of the iron-oar, after that the iron which was contained in it, is melt-

ed out on't.

The iron it self descendeth to the lowest part of the furnace, called the hearth; the which being filled, (so that, if one stayed longer, the iron would begin to swim over through the aforesaid holes) they unstop the hearth, and open the mouth thereof (or the timpas the arts-men call it) taking away a little door, of fashion like unto that of a baker's oven, wherewith the same was shut up very close. The floor of the barn hath a mold of sand upon it, wherein, before they open the surnace, a surrow is made, of sufficient breadth and depth, thro' the whole length of the barn, from the bottom of the surnace until the barn's door: into which surrow, as soon as the surnace is opened, the molten iron runneth very suddenly and forcibly, being to look on like unto a stream or current of fire. It remaineth a long time hot, but doth presently loose its liquidness and redness, turning into a hard and stiff mass, which masses are called sowes by the workmen.

SECT. VIII. Of the different Bigness of the Iron Sowes.

THESE masses or sowes of iron are not always of one and the same weight and bigness, but there is them of all sizes, from one hundred weight until thirty hundred: which difference doth chiefly depend on the different bigness of the furnace and hearth, and partly on the will and discretion of the workmaster or sounder, and according as he either stayeth until the hearth be full, or letteth out the iron sooner; but ordinarily they do not use to cast, or to open the hearth, under less than twelve hours, nor to stay much longer than sour and twenty.

And here is to be observed, that even in surnaces of the same bigness, yearn the self same surnaces, the same quantity of iron is not always cast in the same space of time: but that varieth both according to the nature of the oar, and according to the different seasons of the year. For within the same compass of time you shall cast a greater quantity of iron out of a rich mine or oar, than out of a lean one; and in the summer time, when the coals come in dry and

fresh, than in the winter.

SECT. IX. Of the refining of the Sow-Iron, and the hammering it into Bars.

The Sowes are with teams of oxen drawn to the hammer-works, where being put into the fire again, they melt them into the finery, the finer turning the melted stuff to and fro, till it come to be a solid body, then he carrieth it under the hammer, where it is hammered out into such flat narrow and thin bars, as are to be seen every where: the hammers being huge big ones, and never ceasing from knocking day nor night, as being kept at work by the means of certain wheels, turned about by water-courses in the same manner as the wheels of the bellows.

By means of this second melting, and of that mighty hammering, the iron is freed from a mighty deal of dross and dregs which it kept sticking to it, thorough its whole substance, in the first melting; and so of impure called sowiron, becometh to be useful, such as is accustomed to be delivered unto merchants, being therefore called merchants-iron; one tun whereof is usually had out of a tun and a half of sow-iron; but if that be of the best fort, and cast of the best oar, two hundred pounds less of it will yield the aforesaid quantity of a tun of merchants-iron.

CHAP.

CHAP. XVIII.

Of the Mines of Silver and Lead in Ireland: and occasionally of the pestiferous Damps and Vapours within the Earth.

SECT. I.

Of the several Mines of Silver and Lead, and in particular that of Tipperary.

INES of lead and filver in Ireland have to this day been found out, three in number; one in Ulster, in the county of Antrim, very rich, forasmuch as with every thirty pounds of lead it yieldeth a pound of pure filver; another in Connaught, upon the very harbour-mouth of Slego, in in a little demy-island commonly called Conny-island; and a third in Munster. The first two having been discovered but a few years before this present rebellion, were through several impediments never taken in hand yet;

wherefore we shall speak only of the third.

This mine standeth in the county of Tipperary, in the barony of upper-Ormond, in the parish of Kilmore, upon the lands of one John Mac-Dermot Okennedy, not far from the castle of Downallie, twelve miles from Limerick, and threescore from Dublin. The land where the mine is, is mountainous and barren; but the bottoms, and the lands adjoyning, are very good for pasture, and partly arable; of each whereof the miners had part, to the value of twenty pounds sterling per annum, every one. It was found out not above forty year ago, but understood at the first only as a lead-mine, and accordingly given notice of to Donogh earl of Thomond, then lord president of Munster, who made use of some of the lead for to cover the house which he then was building a bunrattie: But afterwards it hath been found, that with the lead of this min there was mixed some silver.

SECT. II. The manner of digging this Mine: the nature of the Oar, and what proportions of Silver and Lead it yields.

The veins of this mine did commonly rife within three or four spits of the superficies, and they digged deeper as those veins went, digging open pits to ry far into the ground, many fathoms deep, yea castle-deep; the pits not be ing steep, but of that fashion as people might go in and out with wheel-hi rows, being the only way used by them for to carry out the mine or oar. To water did seldom much offend them; for when either by the falling of murain, or by the discovering of some spring or water-source, they sound the

selves annoyed by it, they did by conduits carry it away to a brook adjoyning,

the mountain being so situate, as that might be done easily.

This mine yields two different forts of oar; of which the one, and that the most in quantity, is of a reddish colour, hard, and glistering; the other is like a marl, something blewish, and more soft than the red; and this was counted the best, producing most silver, whereas the other, or glistering sort, was very barren, and went most away into litteridge or dross.

The oar yielded one with another three pound weight of filver out of each tun, but a great quantity of lead, so as that was counted the best profit to the

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Besides the lead and silver the mine produced also some quicksilver, but not any alom, vitriol, or antimony, that I could hear of.

SECT. III. Profits of this Mine. It bath been destroyed by the Irish Rebels.

THE filver of this mine was very fine, so as the farmers sold it at Dublin for five shillings two pence sterl. the ounce; as for the lead, that they sold on the place for eleven pounds sterl. the tun, and for twelve pounds at the city of Limerick. The king had the sixth part of the silver for his share, and the tenth part of the lead, the rest remaining to the sarmers, whose clear profit was esti-

mated to be worth 2000 sterl. yearly.

All the mills, melting-houses, refining-houses, and other workhouses, stood within one quarter of a mile at the furthest from the place where the mine was digged, every one of them having been very conveniently and fufficiently built and accommodated by the officers and substitutes of sir William Russel, sir Bafil Brook, and fir George Hamilton, which three persons successively had this mine in farm from the king, but in the beginning of this present rebellion all this hath been destroyed by the Irish under the conduct of Hugh O-kennedy, brother of John Mac-Dermot O-kennedy, on whose lands the mine was situated: which rebels not content to lay waste the mine, and to demolish all the works thereunto belonging, did accompany this their barbarousness with bloody cruelty against the poor workmen, such as were employ'd about the melting and refining of the oar, and in all offices thereunto belonging: the which iome of them being English, and the rest Dutch (because the Irish having no skill at all inany of those things, had never been employ'd in this mine otherwise than to dig it, and to do other labours) were all put to the fword by them, except a very few, who by flight escaped their hands.

SECT. IV. This Mine free from deadly Vapours, the which otherwise in Ireland are bred within the Earth, as well as in other Countries, as is instanced in a very remarkable History.

I have not heard that any of the miners hath been stifled in this mine, athing ordinary enough in other countries: the reason whereof I conceive to be, because the work was done in wide and open pits, wherein the like noxious va-

pours

pours can neither be so easily engendred, and when they arise find a free passage into the open air, to the contrary of those close and narrow vaults usual in the most part of other mines.

For else that the earth of Ireland is subject, as well as that of other countries, to breed dangerous damps within her felf, is undoubted, as evidently it appeared in the year sixteen hundred thirty seven, by this following accident.

A maulter living in the suburbs of Dublin in St. Francis-street caused a well to be digged three yards deep, which yielding but little water, and that not very sweet nor clear, resolved to have it made deeper; and enjoyned a servant of his, to work at it at spare times, which he doing, and having digged a yard and half lower, the water of it begun the 24th of August to bubble up in a strange manner, making great noise; which having continued two days, without any notable increase, hardly coming half-way the knees; he went down again into the well, to dig there according to his custom. But having wrought but a little while, and being taken with a sudden giddiness in his head, and faintness at his heart, made haste to get out, and being revived, returned to fetch away his spade and other instruments; but coming to the bottom he fell into a deadly fown, which being feen by those that were present, one of them went down to help him up; unto whom the same accident happened. All the spectators being greatly aftonished, and their tumult having drawn on a great concourse of people, the place where the well was being an open yard, looking into the main street; a certain man, newly come to town, and casually passing by that way, not affrighted by the example of those two, had the courage to go down to fetch the former out, but with as ill success as they themselves. The wonder and amazement being hereby increased among the people, there was nevertheless a butcher (a bold robustuous man) who having drunk somewhat liberally, would notwithstanding these sad accidents go in, which at the first not being suffered, and he continuing in his resolution, was at last permitted on condition that he let a strong cord be tied about his waist to pull him out, if he found himself ill; the which to signify he was to hold up his right hand. But being come to the bottom; and fuddenly taken with a deadly faintness, that he had neither time nor power to give the appointed fign, falling from the ladder; and being haled out with all possible speed, found to be in a deep trance, but with perfect figns of life: wherefore being carried to his own house, put into his bed, and care taken of him, it was nevertheless twenty four hours before he came to himself.

The dead bodies being drawn out of the well it was filled with earth by order of the magistrate of the said city.

SECT. v. Relation of an accident like the former happened at London.

THE like accidents have at several times been seen in other countries, whereof we could alledge many instances, but passing by all other we shall make mention of one lately befaln here at London. Without Aldesgate, there is a little
court called carpenters-yard, in the midst of which there stood a pump; the
water

water whereof not being good for to dress meat, was used by the neighbours only for the washing and cleaning of their houses, and the like. But in length of time being grown fo thick and muddy that no use could be made o'nt, it was resolv'd that the well, whereout the pump drew its water, should be made clean, to which purpose the pump being taken down, in the latter end of July anno 1644, a labourer was let down with a cord into the well, being little and narrow, to take out the mud by pails full, who affoon as he came to the bottom presently fell stark dead. Those that had let him down, seeing this, and sufpecting nothing elle, but that a sudden faintness had overcome him, let down another to see what he ailed, and to bring him out. But he sped no better than the first, which when the people perceived, no more went into the well, until three or four hours after, in which middle space of time a great iron pan or plate, heaped up with burning charcoal, had been let down into the well, and leveral times as the fire did flacken, renewed, that through the heat thereof that mortiferous vapour might be overcome and dispersed, the which accordingly fell out; so that the person who afterwards went down to fetch away the dead bodies, got no hurt at all. A great covered or vaulted gutter, whereby the ordures of the streets are under ground convey'd into the city ditch, passeth under the yard wherein the said well, (damm'd up fince this sad accident) did stand; so as it may be probably believed that that deadly infection of the air within the same well had partly been caused through the nearness of the same lewer.

CHAP. XIX.

Of the Freestone, Marble, Flints, Slate, and Sea-coals which are found in Ireland.

SECT. I.

Of the Freefone.

AVING in the precedent chapters treated of the metals and minerals, which are found in Ireland, we shall now go on to speak of severalother substances, raised out of the ground there, of a less noble nature,

but nevertheless profitable and serving for several good uses.

To begin with Freestone, there is two forts of it, the one being grey or ash-coloured, and the other blew; which both for the most part lying in the uppermost parts of the ground, covered over with very little earth, are raised with small labour and charge, whereas in most other countries it is as much labour to dig freestone as the metals themselves. The blew freestone is not very abundant, and as little in request, as unsit for great buildings; it lying for the most

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part in small unshapely pieces; and when they are bigger, commonly broke in the raising and hewing, partly through the unskilfulness of the workmen there, and chiefly because they are exceeding hard, and cannot well endure the iron. The grey freestone which is found very abundantly in most parts of the land is of a contrary nature; and may eafily be cut out into stones of all bigness or fashion, wherefore also this fort hath been used by the English, to all the churches, castles, and edifices, which since the conquest have been builded by them; for the Irish themselves, never had the skill nor industry to erect any considerable buildings of freestone, brick, or other the like materials, their dwellings being very poor and contemptible cottages. True it is, that the English at their first coming found several maritime towns in Ireland with stone walls and houfes, the churches also, not only in those, but in many other towns being of the same; but built by strangers, who being come out of the northern parts of Germany, and other neighbouring countries, had fettled themselves there, inhabiting several parts of the sea coasts, some ages before the English conquest; which people called themselves Oastmans, or easterlings; all those countries of the which they were come being situated to the east of Ireland.

SECT. II. Certain evil Properties of the Irish Freestone.

This fort of grey freestone in Ireland hath a bad quality, that it draweth the moisture of the air continually to it, and so becometh dank and wet both in and out-side, especially in times of much rain. To mend this inconvenience the English did wainscot those walls with oak or other boards, or line them with a thin crust of brick.

SECT. III. Of the Marble.

BESIDES the freestone, which is almost in every part of the land, there is marble found in many places of several sorts; one is red, streaked with white and other colours, such as with a peculiar name is called Porphyry; other black, very curiously streaked with white, and some all of one colour.

The first two sorts are found but in small quantity, especially the second; but the last is very abundant in some places, but most about Kilkenny, where not only many houses are built of the same, but whole streets are paved with it.

SECT. IV. Description of the Marble Quarry at Kilkenny.

The quarry out of which they have their marble at Kilkenny, is not above a quarter of a mile distant from the town, and belongeth to no body in particular, lying in common for all the townsmen, who at any time may fetch as much out of it, as seemeth good unto them, without paying any thing for it it is in fashion like unto quarries of freestone, to wit, a wide open pit, whereout stones and pillars of great thickness and heighth may be digg'd. This marble, whilst it is rude, and as it cometh out of the ground, looketh grayish, but heine

being polished it getteth a fine blewish colour, drawing somewhat towards the black.

SECT. v. Of the Flint.

ALTHOUGH flints are not digged from under the ground, yet shall we give them a place next to the freestone and marble, because of the affinity which they have with them. They are found in every part of Ireland in great abundance near the sea side, within the land, upon the hills and mountains, and in the rivers, many of which have not only their banks covered with them, but also the bottom of their channels, and that for great spaces together, which as they are of all sizes and fashions, so of very different colours.

SECT. VI. Of the Slate.

In sundry parts of Ireland slate is sound in great abundance, and that nothing deep within the ground, just in the same manner as the freestone, so as it may be raised with little charge and labour; wherefore at all times it hath been much used by the English inhabitants for the covering of their houses and other buildings. Nevertheless some years since in places near the sea, especially at Dublin, that kind of Holland tiles, which by them are called Pannen begun to be used generally, the merchants causing them to be brought in from thence in great abundance, because in Ireland they had neither convenient stuff to make them of, nor workmen skilful in that business: although the common tiles usual in many parts of England and other countries, were made and used in several places within the land.

Besides these there was another kind of covering in use, both for churches and houses, to wit, a certain fort of wooden tiles, vulgarly called Shingles; the which are tight enough at the first, but do not many years continue so, it being necessary to change them often: which thing properly not appertaining to this chapter, we nevertheless for affinity's sake have thought not amiss here to

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Some years ago another kind of flate hath been discovered in Ireland, which for the colour's sake is called black-slate, being of a blackish colour, which is come into great esteem, not so much for the ordinary use of covering houses, for which they are no better than common slate, but because it hath been found by experience, very good and medicinal against several diseases, especially to stay all kind of bleeding, and to hinder that after falls and bruises the blood do not congeal within the body.

SECT. VII. Of the Sea-coal.

THE trees and woods having been so much destroyed in Ireland, as heretofore we have shewed, and consequently wood for firing being very dear in great

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part of the land, the inhabitants are necessitated to make use of other fuel, viz. of turf, and of sea-coals. Of the turf we shall speak in the next chapter. As for sea-coals, they are the ordinary firing in Dublin and in other places lying near the sea, where the same in time of peace are brought in out of England, Wales, and Scotland, in great abundance, and therefore reasonable cheap; which is the reason, that the less care hath been taken to find out coal mines in Ireland it felf, whereas otherwise it is the opinion of persons knowing in these matters, that if diligent fearch were made for them, in fundry parts of the land good coal mines would be discovered. This opinion is the more probable, because that already one coal mine hath been found out in Ireland, a few years fince, by mere hazard, and without having been fought for. The mine is in the province of Leinster, in the county of Carlow, seven miles from Idof, in the same hill where the iron mine was of Mr. Christopher Wandsworth, of whom hath been spoken above. In that iron mine, after that for a great while they had drawn iron oar out of it, and that by degrees they were gone deeper, at last in lieu of oar they met with lea coal, fo as ever fince all the people dwelling in those parts have used it for their firing, finding it very cheap; for the load of an Irish car, drawn by one garron, did stand them, besides the charges of bringing it, in nine pence only, three pence to the digger, and fix pence to the owner.

There be coals enough in this mine for to furnish a whole country; nevertheless there is no use made of them further than among the neighbouring inhabitants; because the mine being situated far from rivers, the transportation is

too chargeable by land.

These coals are very heavy, and burn with little flame, but lye like charcoal, and continue so the space of seven or eight hours, casting a very great and violent heat

In the place where this mine standeth, do lye little smith-coals above the ground, dispersed every where in great quantity, from whence the smiths dwelling in the parts round about did use to come and setch them even before the mine was discovered.

CHAP. XX.

Of the Turf, Lime, and Brick, and the Manner of making those things in Ireland; item, Of the Glass made in Ireland.

SECT. I.

Of the two forts of Irish Turf.

Urf being very much used throughout all the land (as we have said before) is of two sorts, according to the difference of the bogs out of the which it is taken. That which is taken out of the dry bogs, or red

red bogs, is light, spongy, of a reddish colour, kindleth easily, and burneth very clear, but doth not last.

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The other to the contrary, which is raised out of the green or wet bogs, is heavy, firm, black, doth not burn so soon, nor with so great a flame, but lasteth a great while, and maketh a very hot fire, and leaveth foul yellowish ashes.

It is the observation of women, that the linnen which is dried by a fire made of this last fort of turf, getteth a foul colour, be it never so white washed and bleached, and groweth yellowish in that manner as that it can hardly be got out again.

SECT. II. The Manner of making the Turf.

THE first fort of turf costeth but little pains in the making; for being digged, and having lain some days a drying (first spread out thin and single upon the ground, and afterwards piled up in little heaps) it is brought into the barn.

But black turf cannot be made without more trouble. First they mark out convenient places; for only those are fit for it to which some paths do lead, and which in themselves are not too miry, and too deep, but have a firm and fandy ground underneath, within the space of four or five feet, or thereabouts. Having found out such a place, if it be too watry, they make some trenches, into which the water descending out of that part of the bog wherein they intend to work, may by them be carried to some place fit for to receive it; to the end that the bog being thereby grown somewhat dryer and firmer, may the better bear the labourers without finking too deep into it. Then they fall to the business, dividing it so among the labourers, that one part of them do dig out the earth, or rather the mud (for all the earth whereof this turf is made, is thin and muddy) and by spades-full cast it on a heap, either by the side of the pit, or somewhere within the same, where others stand, who very well work it, turning it to and fro, and then with their shovels fill it into certain wooden trayes, amongst the English in Ireland peculiarly called Lossels; the which being full, another part of the labourers draw the same, with great cords fastened to them, to some dry place within the bog, or by the side thereof, where having poured out the mud, they go back to fetch more, and fo go to and fro all day long. On that dry place where the mud is poured forth, fit certain women upon their knees, who mold the mud, using nothing else to it but their hands; between the which taking a part of it, they press them together in that manner, that their hands meeting above, the turf is fashioned flat and broad beneath, growing narrower towards the top; which being done, the turf is let lye upon the ground the space of a week or more, according as the weather is, and being reasonably well dry'd, it is piled up in little heaps, leaving every where empty spaces between, that the air and the wind passing through them, they may dry the sooner,

SECT. III. The charges of making Turf.

IRELAND is full of bogs, that every man almost hath bog enough upon his own land to make turf for his family and for all his tenants; so that the turf doth cost most men no more than the hire of the labourers who are employed about it. Those that begun early in the year, whilst the labourers had but little employment, gave ordinarily, besides meat and drink, three pence sterling a day to every man, and two pence to every woman; four pence a day being the ordinary price, and when it was at the dearest, five pence. Twenty men made in two or three days as much turf as was sufficient for the whole years firing of a great family; of which number five men did dig and cast up the mud, five wrought it and filled it into the trays, and ten were busied in drawing the trays to the place where the turt was molded by the women; who went so nimbly to work with it, that only two of them were sufficient to keep twenty men at work.

SECT. VI. Of the Lime, and the manner of making it of Lime-stone.

ALL the lime in Ireland is made not of the shels of all forts of shel-sish, as in Holland, and some other countries, but only of stone; and the grey free-stone, whereof we have spoken in the precedent chapter, is very sit for it, especially when it is not newly come out of the quarry, but taken off old buildings. But a peculiar fort of stone properly called lime-stone, is best for it. This stone is of a grey colour, tending to a dark blew, which being broke, a white dust out of it doth sly abroad; and it is very common throughout all Ireland, but especially in the provinces of Munster and Connaught, lying not deep within the ground, but very near to the surface of it, and in many places above ground.

The manner of burning it into lime, usual over all Ireland, is this; in the side of some little heighth they make a great pit, round or square according as conveniency is offered; of that bigness as may hold forty or sifty barrels, and of that sashion that being many feet wide at the top, it doth by degrees grow narrower towards the bottom, in the same manner as the surnaces of the ironworks. The inside of this pit they line round about with a wall built of lime and stone, at whose outside near the bottom a hole or door is lest, by which to take out the ashes; and above that an iron-gate is laid, which cometh close to the wall round about: upon this they lay a lay of lime-stone (being first knockt asunder with a great iron hammer, and broke into pieces of the bigness of a fist, or thereabouts) and upon that a lay of wood or turs, or a certain fort of sea-coal, the which being wonderful small, and peculiarly called comb, is hardly used for any other purpose. Upon that they lay another of lime-stone, and so by turns, until the whole kiln be filled, ever observing that the out-

Chap. XX. most lay be of wood, turf, or comb, and not of lime-stone: which being done, the kiln is set afire until all be burnt.

SECT. V. Another manner of burning Lime used in Ireland.

THERE is another manner of burning lime used in Ireland, in kilns built altogether above ground, and incomparably bigger than the other, infomuch as to the quantity of three hundred barrels of lime at once is made in them. In these kilns they burn whole stones without breaking them into pieces as the others, and that only with wood (turf or comb not being fit for it) whereof they consume a huge deal, it being necessary from time to time to put new wood into them, to which end three or four men day and night do stand by the kiln to keep the fire from decaying or flackning.

These (called French-kilns, because the use of them was first received from thence) have ever their walls made of lime-stone, the which in the same manner are turned into lime, so as there remaineth nothing standing of these kilns

after that the work is accomplished, and the lime taken away.

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Now albeit that in these kilns a very great quantity of Lime is made at a time, nevertheless it hath been found by experience, that they are much more unprofitable than the others, because they consume much more firing in proportion, through the continual renewing of the fire, and require the constant labour of several men all the while they are burning, which commonly is the space of three days and nights. For these reasons was the use of these kilns, which never had been very general in Ireland, more and more left off in these last years, and the others almost only made use of; in the which the lime came to stand them, who burnt it, in no more than four pence the barrel at the most, all manner of expences being reckoned; and but three to them who had the best conveniencies.

SECT. VI. Of the Brick.

In every part of Ireland there is found a kind of clay very fit for to make bricks, and all forts of potters-ware, although the Irish never had the wit or industry to make use of it for either of these two ends; yeathey have ever been To far from making any earthen vessels, that even the use thereof hath been very rare amongit them, and to the most part unknown, not only before the coming in of the English, but also since, yea even until these very last times; although a great number of English potters in several parts of the land had set up their trade, so as all kind of earthen ware was very common, and to be had at very easie rates.

And as for the brick, they have been little used in Ireland even among the English themselves for a great while; but of late years they begun to be very common, as well in the country, as in the cities, especially Dublin, where all the new buildings (the which not only in handsomness, but also in number,

do surpass the old) are all made of brick. But that which is made in Ireland, for the most part is not so good, as that of other countries, not so much for a ny unsitness in the clay it self, as for want of handling and preparing it aright; as may easily be conceived by the following description of the manner they use to make it.

SECT. VII, The manner how they make their Brick in Ireland.

THEY digagreat square pit, taking away all the uppermost earth until they come to a good clay (which commonly lyeth one or two lpits deep) this they digg up throughout the whole pit, and having broke it very small with the spade, they do by degrees pour a great deal of water amongst it, working and labouring it together with the spade and their feet, till the whole mass become uniform, firm and tough like stiff dough; the which then in wheel-barrows is carried out of the pit to a place where certain long tables are fet up, to each of which tables is allotted one man, one woman, and one boy. The woman taketh up the clay by handfulls, from the heaplying upon the ground, and reacheth it unto the man, who thrusteth it into a little wooden form without bottom, strawing now and then some sand upon the table, that the clay may not flick to it: and so having given them their due fashion, the boy doth carry whem from thence to a place, where he layeth them all upon the ground, not under any covert, but in the open air. After they have lain some days, and are somewhat dryed, they are piled up in small heaps, twenty or thirty in a heap, making the heaps transparent in the same manner, as we have shewed above of the turf, some days after those little piles are made into greater, which are many feet long, and five or fix feet high, but not above two feet, or two and a half broad (making the lays transparent, with some empty space between brick and brick, even so as in the small piles) the which at the top are covered over with straw, laying upon the straw broad green sods, to keep off the rain. Having lain so until they be quite dry, they make great ovens or kilns of them, filling them within the same, strawing betwixt them of that small fort of seacoal, whereof we have spoken heretofore, called comb or coome, and having covered over the kiln with the same clay, whereof the bricks are made, the thickness of two handbroads or there-abouts, they set it afire with wood underneath, and continue the fire until not only all the bricks piled within the kiln, but all the walls quite through, and at the out fide as well as at the in-fide, be perfectly burnt, and turned into good brick: wherein oftentimes, through the unskilfulness or neglect of those who make and fill these kilns, and of those that govern the fire, there is great lofs, and that two manner of ways. For fometimes great part of the bricks is found not to be sufficiently nor uniformly burnt; and on the other fide it falleth out oftentimes, that great quantities are reduced into one, being burnt, or half-burnt into great unshapely masses or lumps which are good for nothing.

They do commonly burn in those kilns two or three hundred thousand bricks at a time; the which for the most part, all charges being reckoned, come to stand betwixt six and eight shillings sterling the thousand.

SECT. VIII. Of the Glass made in Ireland.

WE shall conclude this chapter with the glass, there having been several glass-houses set up by the English in Ireland, none in Dublin or other cities, but all of them in the country; amongst which the principal was that of Birre, a market town, otherwise called Parsons town, after one sir Lawrence Parsons, who having purchased that lordship, built a goodly house upon it; his fon William Parjons having succeeded him in the possession of it; which town is situate in Queens-county, about fifty miles to the south-west of Dublin, upon the borders of the two provinces of Leinster and Munster: from this place Dublin was furnished with all sorts of window and drinking glasses, and such other as commonly are in use. One part of the materials, viz. the sand, they had out of England; the other, to wit the ashes, they made in the place of ashtree, and used no other. The chiefest difficulty was, to get the clay for the pots to melt the materials in; this they had out of the north.

CHAP. XXI.

Of the Temperature and Qualities of the Air, and Seasons in Ireland, as for Heat, Cold, and Moisture.

SECT. I.

Of the Cold weather, and the Frosts.

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LTHOUGH the climate of Ireland is somewhat northerly, the land extending it felf from the beginning of the one and fiftieth degree of latitude, until the end of the five and fiftieth, nevertheless is the air there very temperate, and nothing subject to violent colds (not only in Munster, Leinster, and Connaught, but even in the most northern part, to wit the province of Ulster) much less than any other land lying in the same height or latitude, yea than many countries of a much more foutherly climate.

True it is, that the cold weather doth commonly begin here somewhat soon, namely in the beginning of October, and sometimes in the middle or latter end of September, continuing ordinarily the space of five or six months, until the midst or latter end of March, and sometimes also good part of April; during which whole space of time all such persons as are chilly and cold of nature, and

do fit still much, can hardly be any long while without a fire.

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But again on the other fide, it is very feldom violently cold there, and freezeth but little: there are commonly three, or four frosts in one winter; but they are very short, seldom lasting longer than three or four days together, and withall at their very worst nothing near so violent as in most other countries; so that some all winter long hardly come near a fire once in a day; and that not only in the ordinary cold weather, but even whilst it is a freezing.

Yea many times the cold is to flack even in the midst of the winter-months, that by walking only, or doing some other moderate exercise, you shall find your self as warm, and the air as sweet and pleasant, as if it were in the month

of May

There hath been some winters, wherein it hath frozen ten or twelve days together, so as the Lissie, and other the like rivers were quite frozen, and might be gone upon by men and beasts: but those are altogether extraordinary, and do

come very feldom, hardly once in the space of ten or twelve years.

But how mild they ordinarily be, and how little subject to excessive cold, may appear hereby, that all kind of beasts and cattle, as cows, horses, and sheep, do there all winter long remain abroad, and do feed in the fields, where they are left in the night-time as well as in the day, and that many herbs, which in England and Netherland do dye every winter, here continue all the year long.

SECT. II. Of the warm Weather.

And as the cold in winter is very moderate and tolerable, so is also the heat in summer; the which is seldom so great, even in the hottest times of the year, as to be greatly troublesome. And it salleth out oftenough in the very summermonths, that the weather is more inclinable to cold than to heat, so as one may very well endure to come near a good fire. And this cometh to pass only during the wet weather, for else, and whilst it is fair, it is very warm all summer long, albeit seldom over-hot: and so it is many times also even on the rainy days, whereas for the most part it is very cool in them, and the heat much less than the season doth require.

SECT. III. Of the Rain and wet Weather.

The rain is very ordinary in Ireland, and it raineth there very much all the year long, in the summer as well as in the winter. Commonly in the spring of the year it is very fair weather, with clear sun-shine from morning till night, for the space of five or six weeks together, with very little or no interruption; which fair weather beginneth commonly in the month of March, some years in the beginning, other years in the midst, and sometimes in the latter end of it. But the same being once past, it raineth afterwards very much all the summer long, so as it is a rare thing to see a whole week pass without it; and many summers it is never dry weather two or three days together. Which inconstancy and wetness of the weather is not only troublesome to men, but also hurtsul.

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hurtful to all things growing out of the ground for mans behoof. For the heat never being very great, and there besides often interrupted by the intervention of the foul weather, hath neither time nor strength enough to ripen them so well and fo foon, as otherwise it would; whereby it cometh to pass, that as well the fruits of trees, as the corn and grass, here commonly much later do come to perfection, than in the most part of other neighbouring countries. And as the ripenels of the fruits and other increase of the earth is greatly retarded by the abundance of unseasonable rain; so it doth also fall out oftentimes, that the same being come to ripeness, it is difficult to get them in, by reason of the exceeding store of rain which doth come down during the hay-time and the har-Wherefore it behoveth one here to be wonderful diligent, and not to lose any part of the fair weather: For else one would run great hazard to suftain great losses, and to have all spoiled. But those that are vigilant and careful, and that lose no occasion at all, do commonly in the end get in their increase well enough, notwithstanding all those great hinderances; so that there be as few years of dearth in Ireland, as in any other country of christendom; and most years there is not only corn enough got for the sustenance of the inhabitants, but a great deal over and above, for the sending out of great quantities of grains into other countries.

SECT. IV. Of the fair weather in the latter end of Autumn. In the foul weather the nights are often fair.

In the latter end of autumn weather is commonly fair again for some weeks together, in the same manner as in the spring, but not so long; which as it doth serve for to dry up, and to get in the corn and hay, which till then hath remained in the fields, the too much wet having hindered it from being brought away sooner; so it giveth the opportunity of plowing the ground, and sowing

the winter-corn; the which otherwise would very hardly be done.

For that season being once past, you have very little dry weather the rest of the autumn, and during all winter. And although it doth seldom rain continually for many days together, yet is the wetness very great, and sew weeks do pass, wherein are not two or three rainy days. And it is to be observed, that ordinarily it raineth in Ireland much more by day than by night; and that many times when it doth rain two or three days together, the nights between are very clear and fair; the which also many times falleth out in other foul weather, and when all day long the skie is overcast with clouds and mists.

SECT. v. Some dry Summers in Ireland, but bardly ever any too dry.

But although it is ordinarily thus in Ireland; yet the same inconstancy and variableness of years and seasons, which is observed in most other countries, doth also here occur, and that more in regard of the summers and dry weather, than of the winters and cold. For it is marvellous seldom to have there a hard winter and long frost; but summers have been which were full of very dry, and

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fair and pleasant weather. But as winters cruelly cold, so likewise over-dry summers do in this island hardly come once in an age; and it is a common saying in Ireland, that the very dryest summers there never hurt the land: for although the corn and grass upon the high and dry grounds may get harm, nevertheless the country in general gets more good than hurt by it: and when any dearths fall out to be in Ireland, they are not caused through immoderate heat and drought, as in most other countries, but through too much wet, and excessive rain.

SECT. VI. Amendment of the wet Air in Ireland how to be expected.

So that the Irish air is greatly descentious in this part, and too much subject to wet and rainy weather; wherein if it were of somewhat a better temperature, and as free from too much wet, as it is from excessive cold, it would be one of the sweetest and pleasantest in the whole world, and very sew countries could be named, that might be compared with Ireland for agreeable temperateness. And although it is unlikely, that any revolution of times will produce any considerable alteration in this (the which indeed in some other countries hath caused wonderful changes) because that those who many ages ago have written of this island, do witness the self same things of it in this particular, as we do find in our time: there is nevertheless great probability that this desect may in part be amended by the industry of men, if the country being once inhabited throughout by a civil nation, care were taken every where to diminish and take away the supersuous and excessive wetness of the ground, in all the watery and boggy places, whereby this too great moistness of the air is greatly increased, and partly also occasion'd.

This opinion is not grounded upon some uncertain speculation, but upon assured experience; for several knowing and credible persons have affirmed to me, that already some years since good beginnings have been seen of it; and that in some parts of the land well inhabited with English, and where great extents of bogs have been drained and reduced to dry land, it hath been found by the observation of some years one after another, that they have had a dryer air,

and much less troubled with rain, than in former times.

Herewith agreeth what we read in that famous writer Pliny, in the fourth chapter of the seventeenth book of his natural history, concerning that part of Macedonie, wherein the city Pilippi was seated; where the air formerly having been very rainy, was greatly amended by the altering the wetness of the ground: His words are these, Circa Philippos cultura siccata regio, mutavit cæli habitum: that is word for word, the country about Philippi being dryed up through tillage, bath altered the quality of the air.

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CHAP. XXII.

Of the Dew, Mist, Snow, Hail, Hoar-frost, Thunder and Lightning, Earth-quake and Winds.

SECT. I.

Of the Dew.

HE naturalists and geographers do assure us, that it deweth exceedingly in the hot and dry countries, and that the less it useth to rain in a country, the dew doth fall there the more abundantly; whereby it should seem to follow, that in the wet climate it deweth very little, and consequently that in Ireland, where it raineth so very much, the dew must be very scanty. But there is as much dew there, as in other countries that are a great deal hotter and dryer. Only thus much experience doth shew in Ireland (and it may be as well in other countries, whereof I have not yet informed my felf) that when it is towards any great rain, little or no dew doth fall; so as in those times going forth early in the morning into the green fields, you will find them altogether dry, and that even in that season, wherein the dew in Ireland, as in other neighbouring countries, useth to fall more abundantly, than in any other time of the year, to wit in the months of May and June: this is a certain fign to the inhabitants, that great rain is to fall suddenly; and commonly after such a dry and dewless night it useth to rain two or three days together. But the preceding rain doth not hinder the dew in that manner, as that which is imminent; and it is found ordinarily, that in a clear night following a rainy day (the which is very ordinary, as we have faid in the preceding chapter) the dew cometh down as liberally as if it had not rained the day before.

SECT. II. Of May-dew, and the manner of gathering, and preserving it.

The English women, and gentlewomen in Ireland, as in England, did use in the beginning of the summer to gather good store of dew, to keep it by them all the year after for several good uses both of physick and otherwise, wherein by experience they have learnt it to be very available. Their manner of collecting and keeping it was this. In the month of May especially, and also in part of the month of June, they would go forth betimes in the morning, and before sun-rising, into a green field, and there either with their hands strike

strike off the dew from the tops of the herbs into a dish, or else throwing clean linnen cloaths upon the ground, take off the dew from the herbs into them, and afterwards wring it out into dishes; and thus they continue their work until they have got a sufficient quantity of dew according to their intentions. That which is gotten from the grass will serve, but they chuse rather to have it from the green corn, especially wheat, if they can have the conveniency to do so, as being perfuaded that this dew hath more vertues, and is better for all purposes, than that which hath been collected from the grass or other herbs. The dew thus gathered they put into a glass bottle, and so set it in a place where it may have the warm fun-shine all day long, keeping it there all the summer; after some days rest some dregs and dirt will settle to the bottom; the which when they perceive, they pour off all the clear dew into another vessel, and sling away those setlings. This they do often, because the dew doth not purge it self perfectly in a few days, but by degrees, so as new dregs (severed from the purer parts by the working of the dew, helped on by the fun-beams) do fettle again; of the which as often as those good women see any notable quantity, they still pour off the clear dew from them: doing thus all summer long, until it be clear to the bottom.

The dew thus thoroughly purified looketh whitish, and keepeth good for a year or two after.

SECT. IV. Of the Mists and Fogs.

WE have shewed how much Ireland is subject to rain, and so it is likewise to dark weather, and overcasting of the air even when it raineth not, which

continueth sometimes many days together, especially in winter time.

But as for the fogs and mists, Ireland is no more troubled with them than other regions, especially in the plain country, for in the mountains they are much more frequent, so that oftentimes they are covered with them for a great way the space of some hours together, when at the same time there is none in the neighbouring plain country; and in the high mountains it cometh many times to pass that in a fair day the top thereof for a long time together is covered over with a thick mist, when not only the adjacent country, but even the lower part of those mountains do enjoy a clear sun-shine. And sometimes it befalleth the tops as well as the lower parts being free from them, the middle parts are quite covered therewith: as my brother in his travels hath many times observed in several parts, especially upon those high mountains between Dundalk and Carlingsord, as well in the midst of the summer, as at other times of the year.

And in many places it is found by experience, that the like fogs upon the tops of the mountains is a fore-runner of rain in the next country: whereof all those who have lived any time at Dublin, may have good knowledge. For seldom a mist appeareth upon the top of the Wicklow mountains, situated some five or six miles to the south of Dublin, or of the head of Hoath, without being followed with rain at Dublin and the adjacent parts within 24 hours: where-

in is observable, that a fog quite covering those mountains all over is not so sure a sign of rain, as when it is only upon the top: and that those general mists upon the mountains are often seen without any following rain, the which very

seldom or never happeneth in the others.

There be two forts of mists or fogs in Ireland: the one is uniform and constant, quite filling the air of all sides, whereby all manner of prospect is taken away, and continuing after the same fashion, until it vanish by degrees, either ascending up into the air, or falling to the ground; whereof here, as in other countries, the first is commonly followed with rain, and the second with fair weather.

In the other fort are great parcels or flakes of foggy vapours scattered up and down the air, with clear spaces betwixt: the which flakes do not keep one place, but fly to and fro, according as they are driven by the wind, and that sometimes very swiftly; this kind of fog doth arise not only upon the seaside, but also within the land, and upon the mountains: oftentimes turning into a

general mist.

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SECT. v. Of the Snow, Hail, and Hoar-frost.

For the most part there talleth no great store of snow in Ireland, and some years none at all, especially in the plain countries. In the mountains there is commonly greater plenty of fnow, than in other parts, fo that all kind of cattle, do all winter long remain there abroad, being feldom troubled with very great frost or snow, and do feed in the fields night and day, as we have related more amply above; yet it hath happened that in a winter, one of many, abundance of fnow hath faln, instance that of the year 1635, where about the latter end of January and the beginning of February great store of snow did fall to the great damage of the cattle, chiefly in the northern parts (where it did fnow most exceedingly) fo as the people were put to hard shifts to bring their cattle in fafety to their folds and other covered places. One history among the rest by reason of the strangeness of it, I think will not be improper to relate as it hath been afferted to me by very credible persons, A gentleman living about Ballaneah in the county of Cavan, took great pains to fave his sheep, yet missed eleven of them; some days after being come forth to course, his man saw from afar off upon a hill, in a hollow place of a rock, part of it being covered with the top hanging over it, something alive and stirring, they thought it had been a hare or a fox, but coming near they found it was the lost sheep, the which had near eaten away all the wool from one anothers back (being destitute of all other food, all round about being covered with deep fnow) and which is more wonderful one of them being dead, the rest did eat her flesh, leaving nothing but the bare bones.

It doth also longer continue there: so as it is an ordinary thing in those by Dublin, and all other high mountains throughout the land, to see the snow lying upon the tops of them many days, yea weeks, after that in the nether

parts and plain country it is thawed and quite vanished.

It haileth there but seldom, and in thin short showers, the hail-stones also

being very little.

As for the hoar-frost, that is as common here as in other countries, and that not only in the coldest months, and during the frost, but even in the spring: so as commonly during all the fair weather of that season, of some weeks together, whereof we have spoke heretofore, every morning all the green herbs of the gardens and fields are quite covered over with it.

SECT. v. Of the Thunder, Lightning, and Earthquakes.

IRELAND is as little subject to thunder and lightning, as any other country in the world, for it is a common thing, to see whole years pass without them, and in those years, wherein any are, one shall seldom have them above once or twice in a summer, and that with so weak noise of the thunder, and so feeble a shining of the lightning, that even the most fearful persons are hardly frightned at all thereby, much less any harm done to men or beasts.

From earthquakes this island is not altogether exempt; but withal they are so seldom, that they hardly come once in an age: and it is so long ago since the last of all was, that it is as much as the most aged persons now alive can

even remember.

SECT. VI. Of the Winds.

WITH winds it is in this country almost as with rain, Ireland not only having its share in them, as other countries, but being very much subject to them, more than most other parts of the world. For the winds blow very much at all times of the year, especially in the winter months, when also there are ma-

ny storms, which sometimes do continue several days together.

And it is worth the observation, that not only storm-winds, but others also, do in Ireland much seldomer blow out of the east, than out of the west, especially in the winter; so that commonly there is no need of a wind to be wasted over into England: where to the contrary, those, who out of England will come over into Ireland, very ordinarily are constrained to wait two or three weeks, and sometimes five or six weeks, yea it hath saln out so more than once, that in two whole months, and longer, there hath not been so much east wind, as to carry ships out of England into Ireland: notable instances whereof the history of the first conquest of Ireland, and that of the lord Mountjoy, subduer of Tyrone's rebellion, doth afford.

But in the summer time, and chiefly in the spring, and in the months of March, April, and May, one is not so much subject to that incommodity, as

in the other times of the year.

And as the west winds are much more common in Ireland, especially upon this coast lying over against Great-Britain, than the east; so likewise the south winds are much more ordinary there, than the north: which two winds there

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do seldom blow alone, but for the most part do accompany one of the two other, especially the north wind, the which also doth oftner join it self with the east than with the west wind.

CHAP. XXIII.

Of the Healthfulness of Ireland, and what Sicknesses it is free from, and subject unto.

SECT. I.

Many old and healthful People in Ireland.

LTHO' Ireland is obnoxious to excessive wetness, nevertheless it is very wholsome for the habitation of men, as clearly doth appear by that there are as few fickly persons, and as many people live to a greatage, as in any of the neighbouring countries: for both men and women, setting those aside who through idleness and intemperance do shorten their days, attain here for the most part to a fair age, very many living to be very old, and to pass not only the age of fourscore, but of fourscore and ten; and several there are found at all times, who do very near reach an hundred years, some out-living and passing them. And the most part of those aged persons are in very good disposition, enjoying not only their health, but also the use of their limbs, senses, and understanding, even to their utmost years. Among the women there are several found, who do retain not only their customary purgations, but even their fruitfulnels, above the age of fifty years, and some until that of fixty: my brother hath known some, who being above threescore years old, have not only conceived, and brought forth children, but nursed them, and brought them up with their own milk, being wonderful rare and almost unheard of in other countries.

SECT. II. Ireland free from several Diseases.

IRELAND's healthfulness doth further appear by this particular, that several diseases, very common in other countries, are here very rare, and partly altogether unknown. For the scurvy, an evil so general in all other northerly countries confining upon the sea, is until this day utterly unknown in Ireland.

So is the quartan ague, the which is ordinary in England, and in several parts

of it doth very much reign at all times.

As for the tertian ague, it was heretofore as little known in Ireland as the quartan: but some years since, I know not through what secret change, it hath N found

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found access into this island, so that at this time some are taken with it, but

nothing near fo ordinarily as in other countries.

The plague, which so often and so cruelly infecteth England, to say nothing of remoter countries, is wonderfully rare in Ireland, and hardly seen once in an age.

SECT. III. The Immunity from certain Diseases consisteth in the Air, not in the Bodies of the People.

It is observable concerning the forementioned particular, that this privilege, of being free from several diseases, doth not consist in any peculiar quality of the bodies of men, but proceedeth from some hidden property of the land and the air it self. This is made manifest two manner of ways, first, in that strangers coming into Ireland do partake of this same exemption; and as long as they continue there, are as free of those evils, from which that climate is exempt, as the Irish themselves. Secondly, in that the natives, born and brought up in Ireland, coming into other countries, are found to be subject unto those diseases well as other people, and I have known several of them, who being come hither into England, have fallen into the quartan ague, and have as long and as badly been troubled with it, as ordinarily any Englishman useth to be.

And credible persons have affirmed unto me the same of Scotland, namely that the quartan ague never having been seen there, the Scotsmen nevertheles in other countries are as obnoxious to it, as people of any other nation.

SECT. IV. The most part of all kind of Diseases are found in Ireland as in other Countries.

TRUE it is, notwithstanding that privilege of being exempt from certain evils, that the most part of diseases and infirmities, whereunto man's body is subject in other countries, are also found in Ireland, as well outward as inward; and in the number of the inward not only the suddain ones, and those that in a few days or weeks come to an end, being called Morbi acuti by the physicians, as namely seavers, casting of blood, apoplexies, and others of that nature; but also those of long continuance, as the falling-sickness, the palsy, all forts of gout, coughs, the consumption of the lungs, the stone of the kidnies and of the bladder, the cholick, the jaundice, the dropsy, the grief of the spleen, and several forts of loosenesses, with all which evils it is here as in other countries, some of them being very common here, and others happening but seldom, and in sew persons: the more particular relation whereof we will leave for the books of physick, and for those observations, which perhaps my brother some time or other will publish, of what he hath found concerning these matters, in an ample and flourishing practice of eight years, which he hath lived in Dublin.

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CHAP. XXIV.

Of the Diseases reigning in Ireland, and whereunto that Country is peculiarly subject.

SECT. I.

Of the Irish Agues.

S Ireland is subject to most diseases in common with other countries, so there are some, whereunto it is peculiarly obnoxious, being at all times so rise there, that they may justly be reputed for Ireland's Endemii Morbi or reigning diseases, as indeed they are generally reputed for such.

Of this number is a certain fort of malignant feavers, vulgarly in Ireland called Irith agues, because that at all times they are so common in Ireland, as well among the inhabitants and the natives, as among those who are newly come thither from other countries. This feaver commonly accompanied with a great pain in the head and in all the bones, great weakness, drought, loss of all manner of appetite, and want of fleep, and for the most part idleness or raving, and restlesness or tossings, but no very great nor constant heat, is hard to be cured, for those that understand the disease, and seek to overcome it, do it not by purging, which cannot be used at any time without great and present danger; for the fermentation of the humours which causeth the disease, is hereby mightily encreased, and the patient weakned; and hardly with bleeding, which feldom is used with success otherwise than in the very beginning; but with strengthning medicines and good cordials: in which case, and if all necessary prescriptions be well observed, very sew persons do lose their lives; except when some extraordinary and pestilent malignity cometh to it, as it befalleth in some years, with so great violence, that notwithstanding all good helps, some are thereby carried to their graves; the same doth ordinarily come to pass, that it proveth deadly, if the sick do fall into unskilful hands, or negleet all help, or do not observe good directions; in which cases many do perish: and others, who come off with their lives through robustuousness of nature, or hidden causes, are forced to keep their beds a long time in extreme weakness, being a great while before they can recover their perfect health and strength.

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SECT. II. Of the Loofeness.

The looteness doth also greatly reign in Ireland, as well among those of the country as among the strangers, wherefore the English inhabitants have given it the name of the country-disease. Many are a great while troubled with it, and yet get no other harm: and those that betimes do make use of good medicines, are without any great difficulty cured of it. But they that let the looseness take its course, do commonly after some days get the bleeding with it, whereby the disease doth not only grow much more troublesome and painful, but a great deal harder to be cured; and at last it useth to turn to the bloody flux, the which in some persons, having lasted a great while, leaveth them of it self; but in far the greatest number is very dangerous, and killeth the most part of the sick, except they be carefully assisted with good remedies.

That this disease, as also the other, viz. the malignant feavers, are so rise in Ireland, doth partly come through the peculiar disposition and excessive wetness of the air; but partly also through the errors which people do commit in eating and drinking, and other particulars: as manifestly doth appear by that a very great number, not only of the natives, but also of the strangers coming thither, who take careful heed to themselves in abstaining from hurtful things,

never are troubled with either of these infirmities.

SECT. III. Of the Rickets.

A MONG the reigning diseases of Ireland the rickets also may with good reason be reckon'd, a disease peculiar to young children, and so well known to every body in England, as it is needless to give any description of it; and yet to this day never any physician, either English or of any other nation, made any the least mention of it, no not in those works which are expressly written of

all manner of diseases and accidents of little children.

In Ireland this disease is wonderful rife now, but it hath nothing near been so long known there as in England, either through the unskilfulness or neglect of the physicians (the most part whereof in both kingdoms to this day are ignorant not only of the manner how to cure it, but even of the nature and property thereof) or that really it is new there, and never before having been in Ireland, hath got sooting in it only within these sew years, through some strange revolution or constellation, or God's immediate sending: which kind of changes several times have befaln in divers countries, and in Ireland it self we have already shown some such matter in another sickness, namely the tertian ague.

This evil being altogether incurable, when it is gone too far, is hard enough to be cured even in the beginning, except it be very carefully look'd unto, and use made of the best remedies; nevertheless this grief, as well as most others, hath its peculiar medicines, the which being applied betimes, and with convenient care, do with God's blessing for the most part produce the effect desired

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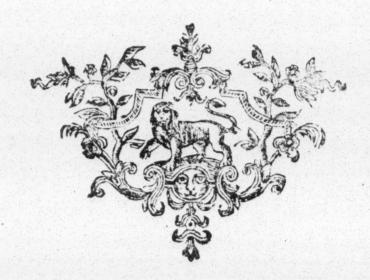
THE rickets are of late very rife in Ireland, where few years ago unknown; so on the contrary it hath been almost quite freed from another dilease, one of the very worst and miserablest in the world, namely the leprosy, which in former times used to be very common there, especially in the province of Munster; the which therefore was filled with hospitals, expresly built for to receive and keep the leprous persons. But many years fince Ireland hath been almost quite freed from this horrible and loathfome disease, and as few leprous persons are now found there, as in any other country in the world; so that the hospitals erected for their use, having stood empty a long time, at length are quite decayed and come to nothing. The cause of this change is not so obscure nor unknown, as it is in most other changes of that nature. For that this sickness was so general in Ireland, did not come by any peculiar defect in the land or in the air, but merely through the fault and foul gluttony of the inhabitants, in the successive devouring of unwholsome salmons. The common report in Ireland is, that boiled falmons eaten hot out of the kettle in great quantity, bring this disease, and used to be the cause why it was so common: and some famous authors have not stuck to relate as much for a truth. But that is a fable, and falmons have not that evil quality, which way soever they be eaten and prepared, but when they are out of season, which is in the latter end of the year, after they have cast their spawn: upon which they do not only grow very weak and flaggy, but so unwholsome, that over their whole body they break out in very filthy spots, just like a scald man's head, so as it would loath any man to see them; nevertheless the Irish, a nation extremly barbarous in all the parts of their life, did use to take them in that very season, as well as at any other time of the year, and to eat them in very great abundance, as eafily they might, every river and rivulet in most parts being very full of them, and by that means that horrible disease came to be so common amongst them. But the English having once gotten the command of the whole country into their hands, made very fevere laws against the taking of salmons in that unwholsome season, and saw them carefully observed; whereby hindring those barbarians against their will to feed on that poisonous meat, they were the cause that that woful sickness, which used so mightily to reign amongst them, hath in time been almost quite abolished: which great benefit, with so many others, that hateful people hath rewarded with feeking utterly to exterminate their benefactors.

SECT. VI. Of the Leaguer Sicknesses.

In the English armies, which since this bloody rebellion went over into Ireland to fight against that murdering nation, were not only the looseness and the malignant feaver, whereof we have spoken above as of Ireland's reigning diseases, very common, but there besides several other infirmities, viz. violene coughs and of long continuance, stopping of the breath, called in latin Dispusea, lame-

English forces, had but too much occasion to know that perfectly.

But withal he hath affured me, that those diseases had their original not from any defect of the climate, but of the cold, and other hardships, which the soldiers suffered in their marches; for they many times going to the fields in cold and foul weather, and fometimes marching whole days long, yea feveral days together, in very dirty and wet ways, where their feet and legs were continually cold and wet, besides that they were sometimes constrained to pass through the water up as high as the knees and waift, and after all that hardship endured in the day-time, to lye in the night upon the wet ground in the open air, this caused the aforenamed diseases, and several others amongst them, in so great number, it being to be wondred at, that many more did not fall into them. And without doubt in any other country of the world, where all the same caufes did concur, and where an army endured the like hardship, the same effects, it not worse would follow: so that in this behalf the land it self is not at all to be blamed.



COLLECTION

OFSUCH

PAPERS

As were communicated to the

ROYAL SOCIETY,

Referring to some Curiosities in

IRELAND.



DUBLIN:

Printed by and for GEORGE GRIERSON, at the Two Bibles in Esex-Street. M, DCC, XXVI.



A

COLLECTION o F PAPERS

Communicated to the

Royal SOCIETY, &c.

Of the Bogs and Loughs of Ireland by Mr. William King, Fellow of the Dublin Society, as it was presented to that Society.



E live in an island almost infamous for bogs, and yet, I do not remember, that any one has attempted much concerning them; I believe it may be of use to consider their origin; their conveniencies, and inconveniencies; and how they may be remedy'd, or made useful.

I shall give you my thoughts, and observations on each of these; tho' I am satisfy'd, that what I shall be able to say, will be very little, in respect of what would be required, on such an important subject, and so very necessary to the improvement of the king-

dom. As to the origin of bogs, it is to be observed, that there are sew places, in our northern world, but have been samous for bogs, as well as this; every barbarous ill-inhabited country has them: I take the loca palustria, or paludes, to be the very same we call bogs: the ancient Gauls, Germans, and Britains retiring, when beaten, to the paludes, is the very same that we have experienced in the Irish, and one shall find those places in Italy, that were barbarous, such as Liguria, were infested with them; and therefore I believe the true cause of them is want of industry; at least industry may remove, much more prevent them. There

are many bogs of late standing in Ireland; when Odonal and Tyrone came to the relief of Kingfale, they wasted the country, especially as they came through Connaught, which by the means of the earl of Clanrichard, was generally loyal; and there is a great tract of ground now a bog, that was then plowed land; and there remains the mansion house of my lord - in the midst of it: now if want of industry has in our remembrance made one bog; no wonder if a country, famous for laziness, as Ireland is, abound with them. To shew you, how want of industry causes bogs, you must remember, that Ireland abounds with springs; that these springs are generally dry, or near dry, in the summer time, and the grass and weeds grow thick about the places where they burst out. In the winter they swell; and run and soften, and loosen all the earth about them; now that swerd or scurt of the earth, that confists of the roots of grass, being lifted up and made fuzzy by the water in the winter, (as I have at the head of some springs seen it lift up a foot or two,) is dried in the spring: and doth not fall together, but wither in a tuft, and new grass springs through it; which, the next winter is again lift up, and so the spring is more and more stopt, the scurf grows thicker and thicker till at first it makes that which we call a quaking bog: and as it grows higher, and dryer, and the grass roots and other vegetables become more putrid together with the mud and flime of the water it acquires a blackness, and grows into that which we call a turf bog. I believe when the vegetables rot the faline particles are generally washed away with the water, as being apt to be diluted in it; but the oily or sulphureal are those that chiefly remain, and swim on the water, and this is that which gives turf its inflammability. To make this appear, 'tis to be observed that in Ireland our highest mountains are covered with bogs, as well as the plains; because our mountains abound more with springs than could be imagined: I remember one high mountain, in the north of Ireland, has four loughs on the fide of it near the top; now no body living on our mountains; and no care being taken to clear the fprings; the whole mountains are over-run with bogs, as I have described.

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2. It is to be observed, that Ireland doth abound in moss more than, I believe, any kingdom; infomuch that it is very troublefome, being apt to spoil fruit trees, and quickfets; I do not remember, that they, who have written of gardening, or orchards, mention it, which I am fure they would, had they been as much troubled with it, as we are; now this moss is of divers kinds, and that which grows in bogs is remarkable, your light spungy turf is nothing but a congeries of the threads of this moss, as I have frequently observed, before it be sufficiently rotten, (and then the turf looks white and is light,) I have seen it in such quantities and fo tough that the turf spades could not cut it: in the north of Ireland, they, by way of joke call it old wives tow, and curie her that bury'd it, when it hinders them in cutting the turf, it is not much unlike flax: the turf-holes in time grow up with it again, and all the little gutters in bogs are generally filled with it; and truly I chiefly impute the red, or turf bog to it; and from it even the hardened turf when broken, is stringy; tho' there plainly appear in it parts of other vegetables: it is observable that both vegetables and animals have very different

different forms, when they are kept under and when out of the water; and I am almost (from some observations,) tempted to believe that the seed of this bogmoss, when it falls on dry and parched ground begets the heath: however the moss is so fuzzy and quick growing a vegetable, that it mightily stops the springs, and contributes to thicken the fourt especially in red bogs, where only I remember to have observed it.

3, It is to be observed, that the bottom of bogs is generally a kind of white clay, or rather fandy marl; a little water makes it exceeding foft; and when it is dry it is all dust; and this contributes much to the swelling of the bogs; for the roots: of the grass do not stick fast in it; but a little wet loosens them, and the water easily gets in between the surface of the earth and them, and lifts up the surface,

as a dropfy doth the skin.

4. 'Tis to be observed, that bogs are generally higher than the land about them, and highest in the middle: the chief springs that cause them being commonly about the middle, from whence they dilate themselves by degrees, as one would blow a bladder; but not always equally, because they sometimes meet with greater obstacles on one side than on the other: whoever has seen bogs, cannot doubt of this; and besides if you cut a deep trench thro' a bog, you will find the original spring, and vast quantities of water will run light, and the bog subside; the bog at Castle Forbes, (as I was informed) subsided 30 foot; I could hardly believe that; but found by computation, that it could not be much less than half of it: I believe these, and other observations that might be made being laid together, it is hardly to be doubted, but that I have given the true origin of bogs: those hills, that have no springs, have them not; those that have springs, and want culture, constantly have them: where ever they are, there are great springs: the turf generally discovers a vegetable substance: it is light, and impervious to the water; the ground under it is very pervious: and all these are

plainly accountable from the causes I have given.

I must confess there are quaking bogs, caused otherwise; when a stream, or ipring runs thro' a flat; if the passage be not tended, it fills with weeds in summer, trees fall a-cross it, and dam it up; then, in winter, the water stagnates farther and farther every year, till the whole flat be covered; then there grows up a course kind of grass peculiar to these bogs; this grass grows in tusts, and their roots consolidate together, and yearly grow higher, insomuch that I have leen of them to the heighth of a man; the grass rots in winter, and falls on the tuits, and the feed with it, which fprings up next year, and fo still makes an addition; sometimes the tops of flags and grass are interwoven on the surface of the water, and this becomes by degrees thicker, till it lye like a cover on the water; then herbs take root in it, and by a plexus of the roots it becomes very strong, to as to bear a man; I have gone on bogs that would rife before and behind, and link where I stood to a confiderable depth; under was clear water, as some of us experienced by falling in with one leg up to the middle, and that by breaking the surface of the earth where we stood: even these in time will grow red bogs; but may easily be turned into meadow, as I have seen several times, merely by clearing a trench to let the water run away.

The

The inconveniencies of these bogs are very great; a considerable part of the kingdom being rendred useless by them; they keep people at a distance from one another, and consequently hinder them in their affairs, and weaken them; for it is certain, that if suppose 1000 men live on 4 contiguous acres, they can both better assist, and defend one another, than if they lived on 4 not contiguous: and therefore it were good for Ireland, the bogs were sunk in the sea, so their good land were all contiguous; but it is further observable here, that generally the land, which should be our meadows, and finest evenest plains, are covered with bogs; this I observed through all Connaught, but more especially in Long ford, and likewise in West-meath, and in the north of Ireland. These bogs are a great hindrance in passing from place to place; in as much as that you are forced to go far about to avoid them, and on this account the roads are very crooked in Ireland; or forc'd (by vast charges to the country) thro' bogs; by these means they are long, and hard to find.

The bogs are a great destruction to cattle, the chief commodity of Ireland; in the spring time when the cattle are weak and hungry, the edges of the bogs have commonly grass; and the cattle venturing in to get it, sall into pits or sloughs, and are either drown'd, or (if they are found) spoilt in the pulling out;

the number of cattle lost this way is incredible.

4, They are a shelter and refuge to tories, and thieves, who can hardly live without them.

The smell and vapours that are from bogs, are accounted very unwholsome; and the fogs that rise from them are commonly putrid, and stinking: for the rain that falls on them will not sink into them; there being hardly any substance of its softness more impenetrable by water than turf, and therefore rain-water stands on them, and in their pits; it corrupts there, and is exhaled all by the sun, very little of it running away, which must of necessity affect the air.

6. They corrupt our water, both as to its colour and taste; for the colour of the water that stands in the pits, or lies on the surface of the bog, is tinctured by the reddish black colour of the turf; and when a shower comes, that makes these pits overflow, the water that runs over tinctures all it meets, and gives both its colour and stink to a great many of our rivers; as I observed through all the

north of Ireland.

The natives heretofore had nevertheless some advantage by the woods and bogs; by them they were preserved from the conquest of the English; and I believe it is a little remembrance of this, makes them still build near bogs: it was an advantage then to them to have their country unpassable, and the sewer strangers came near them, they lived the easier; for they had no inns, every house where you came was your inn; and you said no more, but put off your brogues and sat down by the fire; and since the natural Irish hate to mend highways, and will frequently shut them up, and change them, (being unwilling strangers should come and burthen them;) Tho' they are very inconvenient to us, yet they are of some use; for most of Ireland have their siring from them; turt is accounted a tolerable sweet sire, and we having very impolitickly destroyed our wood, and not as yet found stone coal, save in sew places, we could hardly live without

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some bogs: I have seen turf charc'd, it serves to work iron, and as I have been inform'd, will serve to make it in a bloomery or iron-work: turf charc'd I reckon the sweetest and wholsomest fire that can be; fitter for a chamber, and

consumptive people, than either wood, stone-coal or charcoal.

I know not if it will be worth the observing, that a turf bog preserves things strangely; a corps will lye intire in one for several years; I have seen a piece of leather pretty fresh dug out of a turf bog, that had never in the memory of man been dug before; butter has been found, that had lain above 20 years, and tho not sit to be eaten yet serv'd well enough to grease wool: trees are found sound and intire in them, and those birch, or alder that are very subject to rot. The trees are supposed by the ignorant vulgar to have lain there ever since the flood, but the truth is, they fell on the surface of the earth; and the bog, as I shewed in the beginning of this discourse, swelling by degrees, at last covered them; and being of an oyly vegetable substance, it, like a balsam, preserves them; the trees burn very well, and serve for torches in the night: I have seen them us'd as lights in catching of salmons: I have seen of the trees half sunk into the bogs, and not

quite covered.

I am in the last place to shew you how these inconveniencies may be remedied, and our bogs made useful; 'tis certain the thing is possible; it has been done in England, France, and Germany; and if we had the same industry, we may promite our selves the same success. I know men commonly distinguish between bogs that have no fall to carry away the water from them, and those that have; and determine the last drainable, but not the first: but I must profess I never observed one bog without a fall sufficient to drain it, nor do I believe there is any. But the great and weighty objection against them is the charge; and it is commonly thought, that it will cost much more than would purchase an equal scope of good ground; an acre of good land in most parts of Ireland, is about four soil, per annum, and the purchase 14 or 15 years; and therefore three pound will purchase an acre of good land; and it is very doubtful, with most, whether that sum will reduce a bog: this reasoning passes current, and is the great obstacle and impediment of this work, but if these things following were done and considered, I verily believe it would be removed.

1. An act of parliament should be made, such as was for the building of London; that who did not in such a time, make some progress in draining their bogs, should part with them to others that would, and allow a passage to them thro their lands; rather than gentlemen would let others come into their bounds, they would purchase their bogs at double the rate, as they do patches of land with-

in them.

2dly. 'Tis to be confidered, that quaking bogs, tho' land be never so cheap, never fail to be worth the draining; one trench drains many acres; and when

dry, it is generally meadow, or the best grazing ground.

3dly. Every red bog has about it a deep marshy sloughy ground, which they call the bounds of the bogs, and which never fails to be worth the draining: one deep trench round the bog, doth it; by this cattle are kept out of the bog, and all the bounds of the bog turned into meadow, as I have frequently seen.

4thly

4thly. As to red bogs, I remember one of 60 acres, which a gentleman drained; the land about it was 4 s. 9 d. per acre; it was not worth any thing, but rather pernicious to his cattle; he reduced it to good grazing ground worth 3 s.

an acre, for 25 l. which is less than 3 years purchase.

orthly. Gentlemen ought to confider, that what they lay out this way, goeth by degrees, and they are not sensible of it; it goeth among the tenants, and enables them to pay their rent the better: 'tis a work of charity, and imploys hands, and conduces to both the ornament and general profit of the kingdom; and therefore they ought to dispense with it, tho' somewhat dear.

othly. That even red bogs might be made fit for grazing, at a much cheaper rate, than they have been hitherto, if these rules were observed: 1.a deep trench must be made round the bog, as before; this reduces all the bounds of the bogs, goes a great way to dry the bog it self; and hinders at least its growing: it serves likewise as a common fink, into which all your drains vent themselves.

2dly. In the bog, observe which way the little floughs run; be sure to cut their drains a-cross them; one drain so cut doth more, than 3 or 4 long ways;

as I faw by Experience.

3dly. The first drains on the bog, ought not to be above 2 or 3 foot deep or wide; deep trenches ought by no means to be attempted at first; for the bog is so soft, that they will not stand, but fill up again; neither can any body stand well in them to cut them deep: but when the surface of the bog is cut in little trenches, suppose at 20 or 40 perch, distance, it is hardly credible how much it will be dried: I remember such a little trench, drawn thro' a bog, that was very wet, dried it, so that cattle could graze on it all Summer; and the bog subsided, for an hundred yards, on each side, so visibly, that one would have believed it a natural valley.

4thly. A year or two after the little trenches are made, and the bog a little dry; they are (at least every other trench as one sees occasion is,) to be made six foot deep and six wide, if the fostness of the bog will permit; if not, then six foot wide and 4 deep is enough; and this will certainly make the bog useful for grazing: in a year or two after, you may attempt to cut one or two of the trenches to the bottom of the bog; for till that be done, I do not reckon the

bog secured.

5thly. A gentleman ought to oblige all his tenants to cut the turf in his trenches, and likewise cut his own so, for this is just so much gain, and prevents that pitting of bogs, that renders them deformed and pernicious to the

cattle.

of the water, and so make a communication to the common drain, and if his pits be once dried, there will grow grass or heath at the bottom, fit for grazing; and they will be shelter for cattle in storms.

7thly. When his bog is dried, it is thereby made better turf: and then he is to set out a part of it for that use, and to oblige them to cut it clear away; and the bog being removed, the bottom will make good meadow; as I have seen in

the county of Long ford.

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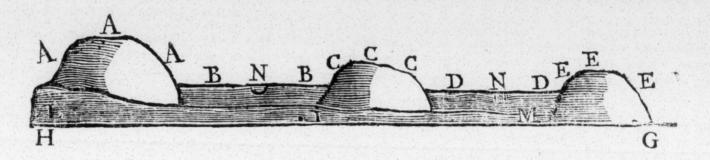
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8thly. If he would improve his bog any further than grazing; he must do it either by cutting off the surface of the bog and burning it, or else by bringing earth and laying on it: sanding or rather indeed gravelling is a great improvement in this country; the land so manured will bring corn 12 or 14 years, and would bring grass, if people did not plow it so long, as to consume all the substance of it, and destroy the roots of the grass, which are not to be recovered in many years, and then they say gravelling is bad for grass; but the contrary is apparent, especially in bogs. I have observed by the way side where those ways pass thro' bogs, if a little earth hath fallen on the bog, as some times there doth fall a little of that which they bring to mend the high way, it has turned the bog into a green sod, with a very sine scutch grass on it: and I doubt not but the same charges, that sands or gravels land, would reduce a dried bog; even to be arable: but this requires time and experience, which I doubt not but will find out many compendious and easy methods of performing these things, more than we can think of.

'Twere natural to add something concerning loughs, and turloughs: the natural improvement of loughs, or lakes, is first to drain them as low as we can; and then turn the residue of the water into fish-ponds, by planting a few trees about them, and ordering them thus, they may be made both useful, and orna-

mental.

As to those places we call turloughs, quasi Terreni lacus, or land-lakes; they anfwer the name very well, being lakes one part of the year of confiderable depth; and very smooth fields the rest: if my memory does not fail me, Dr. Brown describes exactly the like in Hungary, or else in the way between Vienna and Venice; there are in these, holes out of which the water riseth in winter, and goeth away towards fummer, many hundred acres being drowned by them; and those the most pleasant, and profitable land in the country: the soil is commonly a marl, which, by its stiffness, hinders the water from turning it into a bog; and immediately when the water is gone, it hardens, fo that you ride thro' an even grassy field; these, if they could be drained, would be fit for any use, would make meadow, or bear any grain; but especially rape; which is very profitable. They are chiefly in Connaught; and their cause is obvious enough, it is a stony hilly country; the hills have cavities in them, through which the water passes: it is common to have a rivulet fink on one fide of a hill, and rife a mile, or half a mile, from the place: the brooks are generally dry in summer; the water that should be in them, sinking between the rocks, and running under ground; in so much as that in some places where they are overflowed in winter, they are forced in fummer to fend their cattle many miles for water. There is one place on a hill near Tuam, between two of these turloughs, where there is a hole the superstitious people call the Devils Mill, and make fables concerning it: if you stand by this place, you will hear a great noise, like that of a water under a budge: where there is a flood in winter, one of the turloughs overflows, and vents it felf into the hole, and the noise doth, in all likelyhood, proceed from a subterraneous stream; which in summer has room enough to vent all its water; but in winter, when rains fall, the passages between the rocks cannot vent the water, and therefore it regurgitates, and covers the flats.



These turloughs are hard to drain, often they are encircled with hills, and then 'tis not to be expected: often they have a vent by which they send out a considerable stream, and then it is only making that passage as low, as the bottom of the flat, and that will prevent the overflowing: it sometimes happens that the flats are as low as the neighbouring rivulets, and in probability are filled; and then it is not only necessary to make the passage from the flat to the rivulet, but likewise to fink the rivulet, which is very troublesome: commonly the passage to be cut is rocky, having never seen any of them cut, I can on-

ly fay thus much;

1. Before they begin, a surveyor ought to take the level of the flat with the place into which the vent is to be made, and if the place be lower the vent is

possible.

2. A good computation ought to be made, what the vent will cost? how much land it will drain? what the land is worth per acre, as it is? and what it will yield when drain'd? and by that he will see, whether it be worth the while

to attempt it.

3. The holes N N ought to be opened, and digged, and fenced about, that grass, and other dirt, may not get into them: for by this means the water will, in its ordinary course, get sooner away: and lastly, they are to be eaten very bare towards the end of summer, that as little grass as is possible may be spoilt by the water.

I. Pan



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A of 1. Part of a Letter dated June 7. 1697. giving an Account of a moving bog in Ireland.

On the 7th day of June, 1697 near Charleville, in the County of Limerick, in Ireland, a great rumbling, or faint noise was heard in the earth, much like unto the sound of thunder near spent; for a little space the air was somewhat troubled with little whisking winds, seeming to meet contrary ways: and soon after that, to the great terror and Afrightment of a great number of spectators, a more wonderful thing happened; for in a bog stretching north and south, the earth began to move, viz. meadow and pasture land that lay on the side of the bog, and separated by an extraordinary large ditch, and other land on the surther side adjoining to it; and a rising, or little hill, in the middle of the bog hereupon sunk flat.

This motion began about feven of the clock in the evening, fluctuating in its motion like waves, the pasture-land rising very high, so that it over-run the ground beneath it, and moved upon its surface, rowling on with great pushing violence, till it had covered the meadow, and is held to remain upon it 16

feet deep.

In the motion of this earth, it drew after it the body of the bog, part of it lying on the place where the pasture-land that moved out of its place it had before, stood; leaving great breaches behind it, and spewings of water that cast up noisom vapours: and so it continues at present, to the great wonderment of those that pass by, or come many miles to be eye witnesses of so strange a thing.

A true description of the bog of Kapanihane, upon the estate of Brook Bridges Esq; in the county of Limerick, near Charleville; with an account of the motion thereof on the 7th day of June, 1697. in the afternoon, which lasted about half an hour. Communicated by W. Molyneux, Esq.

THE Line A B is the meridian, C a meadow containing 3 English acres, and 32 perches; D firm pasture-land (but of a course, boggy substance) containing 4 acres 3 roods. The line 1, 2. was a hedge of large ash and willow trees between the meadow and the firm land. 3, 4. was the edge of the bog next to the pasture. The prickt lines from 3, to 5. and from 4, to 6. shew the limits or bounds of the bog.

2. The meadow C was lower by a descent of ς foot than the pasture D, and the pasture D was lower by δ foot than the surface of the bog: and there was yet a considerable rising and hill, as at E, the height whereof was above 10 foot above the surface of the bog; so that there was a descent from E to the

meadow.

3. Now I come to its motion, and will prelume to shew the cause in brief. A more than ordinary wet spring occasion'd a prodigious swelling of the height of the bog at E, and at length moisten'd the whole, but chiefly the under part

thereof, the water foaking to the bottom. By this means the turfy hill E being as it were undermin'd, naturally funk down, and confequently pres'd the bog on all hands, chiefly towards the descent; till the pasture D was forced on the meadow C, overturning the intermediate hedge. So that the line 3, 4. is now become 1, 2, and the meadow and the whole bog are level, only there are chasms and great cracks throughout the whole surface of the bog, represented

by the stroaks about E. The bog contains 40 acres.

Whereas some conceive that this motion cannot be naturally explained, for two reasons; First, That no quantity of water was discovered on the said Motion. Secondly, That no considerable descent appears now to the spectators As to the First, I know that there was a quantity of water. And as to the Latter, I know also that there was a descent, as I have described it. My cause of knowledge is, that I hold farms from the said Brook Bridges Esq; joining to, and bounding with the said bog, and was acquainted with the same before the motion.

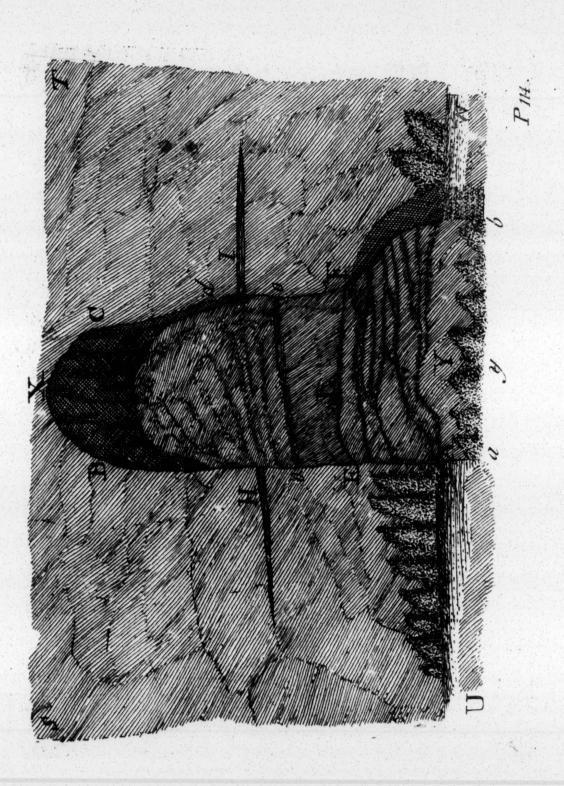
An Account of the Subsiding or Sinking down of Part of a Hill near Clogher in Ireland. Communicated by the Right Reverend the Lord Bishop of Clogher, F. R. S.

L rising from S to T, for near half a mile; and S. T. W.U. the north side of the hill, with a declivity from S. to U. and from T. to W. The perpendicular height at X. to the plain of the bottom at Y. 150 feet, and the slope line or hypotenuse X. Y. 630 feet.

The declivity pretty uniform from X, to L, and from L, to Y, confidenably steeper: The bank A, E, F, D, overgrown with shrubby wood: All the ground on the side of the hill being firm, green, and arable; of a mix'd soil, clay and

gravel, but more clayey.

On Tuesday the 10th of March, 1712-13, in the morning, the people observed a crack in the ground like a furrow made with the plough, going round from A. by B. C. to D. They imputed this to (what they call) athunderbolt; because there had been thunder and lightning on Monday night. But on Tuesday evening an hideous dull noise raised their curiosity; and they observed that the whole space A. B. C. D. containing about three Irish (i.e. $4\frac{3}{4}$ English) acres, had been all day in a gentle motion: And the noise continued all night, occasioned by the rubbing of bushes, tearing of roots, rending and tumbling of earth. The motion ceased on Wednesday after noon; when they saw the bushes on the bank E. F. were removed, some standing and some overthrown, to the plain meadow Y. y. The green ground above E. F. when it came to the top of the steep part at E. F. rent with hideous chasins, ten, sisteen, or twenty seet deep, and tumbled down in rolls of a yard or two thick, and ten or twenty long and broad



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broad; not unlike a smooth water breaking over a cataract, and tumbling in waves below.

There was a precipice at the top X. x. 65 feet perpendicular, making the flope line X. x. 126 feet. The ground from x to L was made more level, the whole perpendicular height of x not exceeding the plain of L above 30 feet; but the ground at L in the whole line from E to F was mounted above 20 feet higher than the unmoved ground on either fide at E and F and the height of L above the plain of y is 55 feet.

There was a ditch H. I. went cross the ground; which being broken off at 0. 0. is removed together with the moving part 34 feet lower down than the immoveable; but at the bottom y. it is tumbled 60 feet over the plain meadow.

The breadth at the bottom a. b. is 400 feet, and at c. d. about 300.

The whole face of the precipice X. x. is of a blue clay, mix'd with many little blue stones. The mettal is very hard when dry; but upon any rain softens to a kind of mortar, without the degree of toughness and stiffness that is natural to clays. It is very much like that gravel or sand (as they call it) which is somewhat of a grey marly nature, and with which of late they so much improve the plow'd land in this country.

About x. there are chasms or gapings full of water, which make a rill down the Hiatus B. E. A. but in no greater quantity than might have been expected from a well sunk to a less depth. Though I was told that there were holes in the higher mountains, that received water under ground; yet I can find no such thing, nor any symptoms of a current under ground, either where it enters or

rifes, in all the neighbouring ground for some miles.

It seems to me that there has been no vacuity under ground to receive the subsiding earth; for what the bank $E.\ L.\ F.$ is raised higher, and what is tumbled down to the plain $a.\ b.$ may very well compensate the subsiding at the pre-

cipice X. x.

But I forgot to mention, that before the rupture the declivity from X. to L. was not altogether uniform, but was hollower where x. is now, than the adjacent parts: It might have been, by the description I have from the people, 10 feet deep in the middle, and 100 feet diameter; and they have a tradition, that this was made by a subsiding before the forty one wars, (the oldest epocha the the country Irish know.)

It lyes in the lands of Slat-beg, two English miles southwest of Clogher, on Mr.

Mowtray's estate.

I have enquired diligently of the neighbours, if they found any shocks or in-

dications of an earthquake, but don't find the least appearance of any.

They impute it to the great and constant rains we have had last harvest and winter, which have soak'd and steep'd all the ground, but cannot guessafter what manner they should produce this effect; for it is impossible any water should stand on the ground or in the vicinity, it being all on the declivity of the hill.

A Letter from the learned and ingenious Mr. Will. Molyneux Secretary to the Society of Dublin, to Will. Musgrave L. L.B. Fellow of New Colledge, and Secretary to the Philosophical Society of Oxford, for advancement of natural Knowledge; concerning Lough Neagh in Ireland, and its petrifying Qualities.

SIR.

N answer to the Oxford Society's query concerning our Lough Neagh and its

petrifying qualities, I make this return.

1. That it is generally agreed by all the inhabitants thereabouts, that it has that quality, but yet I have a letter by me from a gentleman (unknown to me, and therefore I will not promise for his credit or the fidelity of his enquiry) that positively denies that there is any such thing, but afferts that the stones, that are brought to us as petrify'd wood, are found deep in fand hills in the country adjoyning to the lough, alledging as an experiment, that a gentleman of his acquaintance, stuck an oak stake into the lough twenty years ago, which there remains unaltered. But I conceive this affertion to be without ground, and the experiment falfly made; for first 'tis agreed by all that no wood will petrify in this lough, except holly, so that his applying an oak stake was improper; secondly, for their being found in fand hills, they may eafily be supposed in process of time to have been brought thither, and left there: for I do not find he afferts that they are found so deep in those hills that have not been dug up; and thirdly, it is with some probability afferted (and I have a letter from an understanding person thereabouts confirming it) that the earth about Lough Neagh has this petrifying quality, and we may well imagine that these fand hills especially, are not destitute thereof; for I am certainly informed, that a gentleman of the country about this lough a little before the rebellion cut down fome timber for building, and amongst others cut down a large holly tree, but being diverted by the rebellion from building, his timber lay on the ground in the place where it was fell'd, upon the banks of the lough, all the miserable time of the war; till at last, the kingdom being settled, the gentleman went to look for his timber, and found the other timber overgrown with moss, and the holly petrified, the the water of the lough had never reach'd it.

2. I query whether the holly it felf, that grows upon the banks of this lough, may not be more apt to be petrifi'd, than the same wood growing other where, and brought thither, and put into the lough, for certainly if the ground has this

quality, this is very likely to follow.

That what we call Lough Neagh stone was once wood, is most probable on these accounts, first it will not stir with acids, which is a property observed by Dr. Grew on some petrify'd woods, in the Museum R.S.p. 270. tho' the doctor does there make it an argument for his suspecting they are Lapides sui general Secondly, the Lough Neagh stone will burn and slame; and the smoak of it smells like the smoak of wood. Thirdly, when burnt it betrays the very grain of wood, with the other vessels belonging to vegetables. But that which confirms mean bove all, that these stones were once wood is, because I have many of them by me of various degrees of petrification, I suppose according to the time they re-

mained in the water, which I could never hear justly determined; some that have clearly lost the colour of wood, and are become perfectly black, and very hard; others that are not so black nor hard; but one more especially was sent me about a year ago, which is a parallelepiped of about four inches long and an inch thick, cut I suppose whilst wood into that shape purposely, whose outward coat is very black and smooth, but this is merely superficial, for being cleft longwife thro' the middle (which it fuffer'd far more eafily than that which is more throughly petrify'd) I there discovered the whole body perfectly of the colour and grain of holly, for I can scrape it with my nail; but what was most furprizing in it was the discovery of the pith, as plainly and as perfectly distinct in colour and texture from the rest (but it also was petrify'd) as it could possibly have been seen in the natural wood; that this piece when wood was cut into this shape on purpole to try the experiment, I am induced to believe on these accounts, first no tree grows in the shape of the parallalepepid; and that this is not a stone appears from the inward texture, differing so much from the outward coat, and from the smoothness of the outward coat, and roughness inwardly, which smoothness could never be induced fince it was a stone, for if you grind it, so as in the least to wear off the outward black coat, the rough white infide shews it felf immediately.

4. What the learned physician Anselm Boetius afferts in his Historia lapidum & gemmarum is certainly falle, viz. that that part of the wood that is buried in the mud will become iron, that part touch'd by the water becomes stone, and that above the water remains wood, for I never have seen or could hear of any part

of the stone in the least resembling iron.

5. I have used some endeavours to procure a piece of this Lough Neagh stone to which the wood was yet fastned, but I never could attain it, tho' some affert they have seen pieces two or three foot long with about eight or ten inches of stone and the rest wood. Tho' I am apt to believe this may be stretching the matter too far, for I conceive that that humour that petrifies one part, when it begins to operate, infinuates it self soon throughout the whole body.

6. 'Tis observed that this petrifying quality is not equally diffused throughout the whole lough (which is about 15 or 16 miles long, and 8 or 9 miles broad in all places) but is most strong about that part where the black water (a river so call'd) empties it self into this lough, that is about the southwest corner; as likewise 'tis said to be more strong about the edges of the lough, than surther into

the water.

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7. It was queried a while ago by an ingenious and learned member of the R. S. Mr. Hally, whether Lough Neagh stone were not magnetical, for he was told it was; but upon tryal I find it is not, for it will not stir a needle, or steel filings, neither will it apply to the magnet, in pouder or calcin'd.

This is all that offers it self at present relating to the query of the Oxford so-

ciety, if any thing more occur, they shall be informed thereof by

Their most obliged humble Servant,

William Molyneux

An ingenuous Retractation of the seventh and last Paragraph of Mr. William Molyneux's Letter in the Philosophical transactions, Numb. 158. pag. 554. concerning Lough Neagh Stone and its non application to the Magnet upon calcination. Being an abstract of a Letter of the same ingenious Gentleman dated from Dublin November 25. 1684.

Neagh stone and its petrifying qualities, which I hear you have thought worthy to insert in one of your Transactions; in which discourse I must desire you to correct one paragraph, and undeceive the world in a particular there mentioned; which is that Lough Neagh stone, neither crude nor calcin'd, would apply to the magnet: that it will not do so crude, I still affirm; but that it does not apply calcin'd, I must retract: for I find by surther tryal, that it applies calcin'd most briskly, and in great quantities, to the magnet: the occasion of my former error being, that I did not calcine it long enough. If upon a fit opportunity you would do me justice in this particular, you will much oblige me, and vindicate my credit. Sir, I am

Your most humble Servant,

William Molyneux.

Some Observations upon Lough-Neagh in Ireland. In a Letter from Francis Nevil Esq; to the Lord Bishop of Clogher.

Belturbet, Feb. 12. 1712-13.

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My Lord,

Hope it will not be amiss to give your lordship an account of what I have heard and observed of our considerable lake Lough Neagh, so much talked of for its changing wood into stone, which report is too much credited by some, who do yet live near the lough; but I can affure your lordship, there is no such petrifying quality in that water. I lived sourteen years in Dungannon, within five miles of it, and was very often there, about the skirts, for many miles, and in a boat upon it several times. I have taken the survey of a great part of the shore thereof, when I drew the scheme for making the Glan-bog navigable, from the lough thro' part of the upper Bann to Newry; which was done at such a time as the waters were very low, and a large strand left in several places: and many trees lay in the verge of the lough, which I believe might some of them have lain there some hundreds of years, which had been overturn'd

by the lough's encroaching on the land, where great woods had grown; and many roots of great trees were standing in their proper places, where the water had prevailed on the land, and no alteration in the wood at all, but it was firm, found wood, without any petrifaction.

I have had an occasion, among other things, to talk to Mr. Browning upon this subject, a great part of his estate in Ardmagh, lying contiguous to the lough; and he told me, that he did believe that there was not any petrifying quality in the water; for that he had made several tryals, and had ordered holly stakes to be driven into the ground within the verge of the lough, and that some of them

continued there many years, but that he found no alteration.

Yet not with standing all this, there has been great quantities of such fort of stone, like unto wood, found upon the strand after great floods and storms of wind, which have put the lough into a ferment; the waves breaking down the banks, incroaching on the land and tumbling over trees, by which incroachment this fort of stones are discovered: and if ever they were wood, they were petrified by the earth, and not by the water, of which kind I have feen feveral pieces big and little, some like oak, some ash, and some like holly, with bark, grain, and knots like wood; fo that any by the eye would judge it wood, till they come to try it. I had a piece about fixteen inches long, that look'd as if it had been a great chip cut out of the side of an oak block, with the bark on it; and in cutting fuch chips, there happens generally some shakes or flaws in such large chips, so that there will be a separation of parts at one end, and they remain firm at the other, as it was in this. I could have raised several of such splinters of this large chip, some bigger and some less; and when so raised, they would have slapp'd down as tho' they were a spring. Some of these stones would appear at one end as if rotten, and decay'd wood; but trying it, it was as much stone as any other

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Now as to the lake it felf, your lordship has feen it, and I may forbear to give your lording an account of the boundaries thereof: however, it is reputed to be twenty four miles long, and twelve miles broad, and navigable from Charlemount to Portlenone, which is about thirty five miles. It does not abound with many forts of fish, but those that are very good, such as salmon, trout, pike, breame, roch, eels and pollans, with which last it does abound: The English call them fresh water herrings, for want of another name; for pollan is an Irish name. They catch them in the summer with seives, as they do herrings, and they are a great relief to the poor, being very cheap: they are much in shape and bigness like to the largest smelts, full of very large bright scales, and pleasant meat; being eat fresh. These were supposed to be a peculiar fish to that lake; but since I came here, I find Lough Earne has the same fort, but not in so great plenty. They are generally caught here in their eel-nets, running to the fea; to that I am of opinion, that they are that fort of fish that is caught in the sea, or between the fresh and salt-water, call'd shads; and that the large ones come from the sea, as the salmon doth, and leave their spawn in the lough; which, when they grow to be big, go to the sea, and there come to their full growth: and that which confirms me in my opinion is, that at the falmon fishing at Colvaine, they catch many of the large ones going up to the lough. There is one fort of trout in Lough Neagh very large: I have seen one weigh thirty pound weight; and the largest salmon that I ever saw weigh'd not more than thirty five. This

fort of trout the Irish call a Budagh.

That there is some healing quality in the water of this lough, is certain; but whether diffus'd through all parts thereof is not known, nor pretended. There is a certain bay in it, call'd the Fishing-bay, which is about half a mile broad: it is bounded by the school-lands of Dungannon, hath a fine sandy bottom, not a pebble in it, so that one may walk with safety and ease from the depth of his ankle to his chin, upon an easy declivity, at least three hundred yards before a man shall come to that depth. I have been in it several times, when multitudes have been there, and at other times; and I have always observed, that as I have walk'd, the bottom has chang'd from cold to warm, and from warm to cold, and this in different spots through the bay. Several have made the same observation.

The first occasion of taking notice of this bay for cure, happened to be no longer ago than in the reign of King Charles II. and was thus; There was one Mr. Cunningham, that lived within a tew miles of the place, who had an only fon grown to man's estate. This young man had the evil to that degree, that it run upon him in eight or ten places: he had been touch'd by the king, and all means imaginable us'd for his recovery; but all did no good, and his body was fo wasted, that he could not walk. When all hopes of his recovery were passed, he was carried to the lough, where he was washed and bathed; and in eight days time, bathing each day, all the fores were dry'd up, and he became cured, and grew very healthy, married, begot children, and liv'd nine or ten years after. This account I had from Capt. Morris, and his brother, who were eye-witnesses, and at whose house the young man lay, while he continued to bathe there. After so remarkable a cure, many came there, who had running fores upon them, and were cured after a little time. The natives thought it could not do well, but upon some particular time appropriated for that service; and now great crowds come there on Midsummer-eve, of all forts of fick; and fick cattle are brought there likewise and driven into the water for their cure; and people do believe they receive benefit. I know it dries up running fores, and cures the rheumatism, but not with once bathing, as people now use it; and the drinking the water, I am told, will stop the flux. I look upon it to be one of the pleasantest bathing-places I ever saw. I am, &c.

FRAN. NEVIL.

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an be lat An Answer to some Queries proposed by Mr. William Molyneux, concerning Lough-Neagh: by Mr. Edward Smyth, Fellow of Trinity-college in Dublin.

IIT Hether Lough-Neagh bath really the quality of petrifying wood? To this I answer, that no experiment, or observation yet made, (that I can hear of) can prove the lough has this petrifying quality; or that the water does any way help or promote the petrification; for that two experiments made by a gentleman of worth and good credit (whole estate lies contiguous to the lough, and whose curiosity prompted him to a more diligent search into this matter) plainly prove the contrary. For about 19 years ago, he stuck two holly-stakes (a wood which all agree will soonest petrifie in this lough) in two several places of the lough, near that place where the upper band enters into it; and that part of the stake, which for so long time has been washed by the water, remains there without any alteration, or the least advance towards petrification; as for that part of the stake which is covered by the mud or earth, he has not yet looked on it, but promises to do it this summer, taking advantage of the fall of the lough, and that too, which report makes the weakest, and most unfit for this operation, may feem not to conclude universally of the whole lough; yet a reasonable cause of doubting that, which ought to be, yet never was backed by any faithful experiment; and I therefore believe it fabulous; for that had the lough any fuch vertue, it would most probably be diffused in some measure through the whole. This is true of those lakes whose peculiarities are related by Varenius; and this seems evident from the very nature of liquid bodies; for the parts of all liquid bodies being in a constant motion, and mixing with one another, any vertue received in one part, must necessarily be diffused thro' the whole, at least in some degree, but the stakes in this experiment had not suffered the least alteration last summer, tho' they had been almost three times seven years in the water.

2. Whether this quality be equally diffused throughout the whole lough, or be more strong in any particular parts thereof? Because there have been no certain experiments made upon all parts of the lough, and much time required to make this trial we cannot expect a speedy resolution of this query; report for the west side, and Dr. Boat (an author for whose sidelity I vouch not) in his Natural History of Ireland, tells us that as his brother inform'd him, who lived in those parts, that water has especially this vertue about those places, where the black Water discharges it self into the lake, but confesses he never could find any person who himself had made the trial, and therefore had this information from report, or some other way equally uncertain: so that there is still good reason to believe the wa-

ter is wholly destitute of this petrifying quality.

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3. What woods are petrify'd by the lough? or whether only holly? That not only holly, but also oak, and some other wood has been petrified about this lough, and in the soil adjacent, I have sufficient grounds to conjecture on this account; because some fishermen, being tenants of a gentleman from whom I had this relation, told him, they had sound buried in the mud of this lough great trees,

with all their roots and branches petrified; and some of that bignels, that they believ'd they could scarcely be drawn by a teem of oxen. They broke off several branches as big as a man's leg, and many bigger, but could not move the great trunk. If we may credit this relation, we must allow some other woods to be petrified beside holly, for holly never grows to that bigness; the largest trees being scarcely by a third part so big; so that allowing for the unexactness and unfaithfulness of the fishermens relation; we have grounds to believe this wood was other than holly; my chief reason for guessing it oak is the bulk; no trees in that country, these excepted, growing to that prodigious bigness: befides there is much timber found in the mud on fand on the banks, fuch as deal, &c. but no oak, so that I believe what oak was undermined by the water, was covered with mud, and so petrified into stone, and of this fort might that be which the fishermen found; for if some part of that ground which is now covered by the water, was formerly wood, as is on good grounds believed by those that live thereabouts, as it is probable there was much oak in the wood, so it is probable there is much buried in the lough; deal and other trees are found here without any alteration, but what they might suffer in any other water.

4. Whether the wood or holly, brought from other places, be as apt to be petrified, as what grows in the grounds adjacent to the lough? If, as I shall make out in my answer to the last query, this virtue of petrifying does certainly, if not solely reside in the soil contiguous to this lough, most certainly trees that imbibe some of this petrifying vertue, or these lapideous particles with their nourishment, as

being already dispos'd for it, will be more easily altered into stone.

7. What time is requisite to petrifie a piece of a determined bigness? I heard of no experiment which can resolve this query, but what report tells us of seven years is certainly a fable as to the water, I know of no body who has made tri-

al of the foil.

6. Whether any has seen the same body partly wood and partly stone? I was informed by two gentlemen of the north, that this may be frequently seen, who alledged they themselves had seen the same body, wood and stone. But the only reason for thinking so, being the diversity of colours which might well enough proceed from several degrees of petrisaction, we may probably think them deceived: for they made no experiments on that part which they reputed wood. They surther told me, that part of the body which touched the surface of the water was the partition between the petrished and unpetrished part of it; this surther consirms me, they were imposed on. This stone had been often found one part of it rotten and petrished, the other remaining firm and useful: but this it has common with other stones: whether it became rotten in the wood or stone, may be doubted.

7. Whether the bark has been seen seen petrified, as well as the wood? The bark is never found petrified, as I am informed by a diligent inquirer, but often some-

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thing rotten about the stone answerable to the bark.

8. Whether any one has certainly made experiment of the lough's petrifying, by putting a piece of wood therein, and there letting it ly till it was petrified? Several pieces of holly have been put into the lough, but none, that I ever heard of, was ever taken out in any wife altered.

9. Whether there be any sand-pits nigh about the lough in which these pieces of wood (we esteem petrified) are found? I never could hear of any such sand-pits, nor that this petrifying vertue was stronger in any such places; there is a greater quantity of these stones found in the adjacent ground, and when ground is

newly broke, ordinarily turned up in plowing.

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10. Whether the earth, or sand about this lough be indued with this quality? That this virtue is certainly, if not only, in the ground or foil I judge for these reasons, that there are many stones turned up daily especially at their breaking up new ground; which we cannot in any probability think were brought thither; they are often found at two miles distance from the lough, seldom further, in great numbers, and very deep in the ground; now for what use and reason they should be brought thither I can't imagine: but because there may lie exceptions against this reason I shall produce another, which I believe will plainly prove this affertion, it being matter of fact. The gentleman on whose credit I received this information, had occasion one day to survey a part of his own land, and at a small distance from the lough, he saw a stump of a tree just digged out of the ground, which by handling of it he found petrified; his fervant that digged it up, standing by him, told him he had just rooted it out of the ground: he affured me the roots and all were stone, and altogether like those stones that are ordinarily found and go by the name of Lough Neagh stones. This certainly proves the foil to have this petrifying virtue, which was never yet proved of the water. This gentleman was of opinion these were lapides sui generis, till this observation convinced him: and I believe the wood, which I before mentioned that was found by the fishermen petrified, ows its petrification to the soil, and not to the water. But that these stones were once wood is I think very certain, for they shew the plain vestigia of wood, they likewise burn, cleave; filings of this stone thrown in the fire emit a fragrant smell: they cut kindly with a knife, though not so easily, as other wood: but had they none of these properties, the instance now alledged, I think, is as convincing as demonstration.

An Inundation in Ireland, by Dr. Hook.

JUNE 26th. 1680. an innundation happened not far from Londonderry in Ire-J land, more monstrous than that in Gascoygne. 'Tis suspected that both proceeded from some extraordinary change in the subterraneous caverns of those hills from whence the water gushed, very sew mountains being without them. A Letter from Mr. Neve of Maghrafelt in the North of Ireland, to the reverend Mr. W. Derham, F. R.S. giving an account of some Inundations in Ireland.

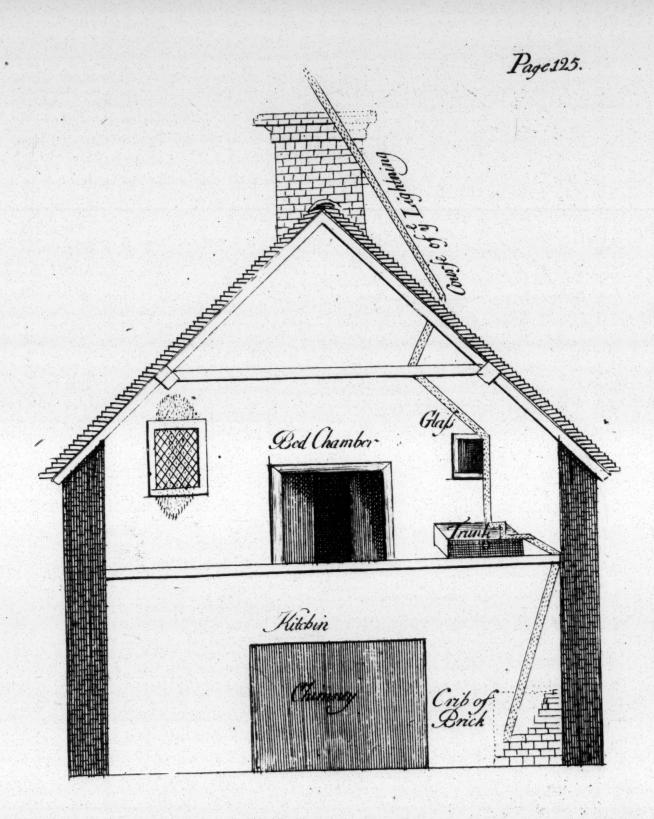
E tells, that on October 7. 1706. after a very rainy day, and foutherly wind, there happened a prodigious flood (the like not in the memory of man) which brake down feveral bridges, and the fides of fome of the mountains in that part of Ireland. That it came running down in vast torrents from some of the mountains, and drowned abundance of black cattle and sheep, spoiled a great deal of corn and hay in the stacks, that it laid abundance of houses two or three soot deep in water, and brake down several of the forge and mill-dams.

Also on July 3, 1707, they had another flood, which came so suddenly from the mountains, as if there had been some sudden eruption of the waters. And also on the 26th, of the same month, in the county of Antrim, there was a very sudden and surprizing flood, which raised the Six-mile-river (so call'd) at that rate, that it brake down two strong stone bridges, and three houses, and carried away 600 pieces of linnen-cloath, that lay a bleaching, fill'd many houses several seet deep with water, tore down some large rocks in its passage, and left several meadows covered a foot or two deep with sand. That they in the southeast part of the county of Derry had that day but little rain with some thunder: But beyond the mountains, in the northwest part of the county, the river Roe had a great flood.

A Relation of the strange effects of Thunder and Lightning, which happened at Mrs Close's House at New-Forge, in the County of Down in Ireland, on the 9th of August, 1707. Communicated by Samuel Molyneux Esq., Secretary of the Philosophical Society at Dublin.

THen I went to wait upon this gentlewoman, about a fortnight after, to inform my felf in all the particulars of this extraordinary accident, the then told me, that the whole day was close, hot and fultry, little or no wind stirring until towards the evening; that there was a small breeze with some mizling rain, which lasted about an hour; that as the air darkned after sun-set, she daw several faint flashes of lightning, and heard some thunder claps as at a distance; that between ten and eleven a clock both were very violent and terrible, and so increased and came on more frequent until a little before 12 a clock; that one flash of lightning and clap of thunder came both at the same time louder and more dreadful than all the rest, which, as she thought, shook and inflamed the whole house; and being sensible at that instant of a violent strong sulphureous smell in her chamber, which she did not perceive before now, and feeling a thick gross dust falling on her hands and face as she lay in bed, she concluded no less than that part of her house was thrown down by the thunder, or set on fire by the lightning; that arifing in this fright, she called up her family, and candles being lighted, she found her bed-chamber full of smoak and dust, as also the kit-

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chin that was beneath it: the rest of the house being safe, she was not sollicitous at that time about any other damage she might have sustained, more than that she observed the looking-glass that hung in her chamber to be broken.

The next day again she found upon further search and inquiry, that part of the top or cornish of the chimney, which stood without that gabel-end of the house where her chamber was, was struck off; that part of the copeing of the splay of the gabl-end it self was broken down, and the shingles on the roof adjoyning thereto (to the number of 12 or 16) were raised or ruffled, but none shatter'd or carry'd away; that part of the ceiling in her chamber beneath those shingles was forc'd down, and part of the plaister and pinning stones of the adjoining wall, was also broken off and loosened, (the whole breach 16 or 20 inches broad.) That at this place there was left on the wall a smutted scar or trace, as if made black by the smoak of a candle, which was directed downwards towards another place on the same wall whereon a breach was also made as the former, and of the same dimensions, part of which was behind the place where the looking-glass did hang; that the boards on the back of a large hair trunk full of table and other linnen, standing beneath the looking-glass were forced in, and splinter'd as if by the blow of a smith's sledge; that two parts of three of the linnen within this trunk were pierced or cut through, the cut appearing of a quadrangular figure, and between two or three inches over; that the end of the trunk was likewise forced out, as the back was drove in; that at about two foot distance from the end of this trunk (where the floor and the side wall of the house join'd) there was a small breach made in the plaister, where a small chink or crevice was to be seen between the side board of the floor and the wall, so wide as that a man could thrust his fingers down; and that just beneath this again in the kitchin the ceiling was forced down, and some of the lime or plaister of the wall broke off; that exactly under this again stood a large tub or vessel of wood inclosed with a crib made of brick and lime, which was broke and splinter'd all to pieces, and most of the brick and lime work about it forced and scattered about the kitchin.

As the gentlewoman gave me this account, I went from place to place viewing each particular; and as I found all was done on or near the gabel-end of the house, I have endeavoured to explain this description by a draught thereof, wherein the several breaches are distinguished: and as I conceived all to be effected by some irresistible body, I have also by two parallel lines traced out its irregular

motion. [See the Figure.]

The further circumstances judged material to be offered, which cannot be represented in the draught, are these: that the looking-glass was broke with that violence, that there was not a piece of it to be found of the largeness of half a crown; that several pieces of it were sticking like hail shot in the chamber door (being of oak) and on the other side of the room; that several of the edges and corners of some of the pieces of the broken glass were tinged of a light slame colour, as if heated in the fire; that the curtains were cut in several pieces, thought to be done by the pieces of the glass; that several pieces of muslin and wearing linnen, lest (on going to bed) by this gentlewoman and daughter on the great

hair trunk, were thrown and scattered about the room, no way singed or scorched; and yet the hair on the back of the trunk, where the breach was made, was finged; that the uppermost part of the linnen within the trunk was safe and well, and the lowermost parcel, consisting of 350 odd ply of linnen; pierced thro', of which none was any way fmutted, but the uppermost ply of a tablecloath that lay above all the rest. The gentlewoman told me, there was a yellow singe or stain perceivable on some part of the other linnen so damaged the next day; and that the whole linnen smelt strong of sulphur; but neither this yellow stain or fmell was perceivable when I was there: that the glass of two windows in the bed-chamber above, and two windows in the kitchin beneath, was io shatter'd, that there was scarce one whole pane left in any of them; that the pewter, brass, and iron furniture in the kitchin, particularly a large girdle about twenty pounds weight, that hung upon an iron hook near the ceiling, was found lying on the floor; that a cat was found dead the next morning in the kitchin, with its legs extended as in a going posture, in the middle of the floor, with no other fign of being hurt, than that the furr was finged a little about the fetting on of the tail.

The gentlewoman told me too, that about some few days before this accident happened to her, she removed a table press-bed from the place where the hair trunk stood, wherein two little girls (her daughters) used to lie; which she look-

ed upon as a particular piece of providence.

I must further remark, that the wall both above and below a little window in the same gabel-end was so shattered at the same time, that the light could be seen through the crevices in the wall; and that upon a large stone on the outside of the wall beneath this window, was to be seen a mark, as if made by the stroke of a smith's sledge or large iron crow, with which a splinter or piece of the stone was broken off of some pounds weight. I was surther inform'd, that from the time of that great thunder-clap both the thunder and lightning diminish'd gradually, so that in an hour's time all was still and quiet again.

A northern Streaming, by Mr. Neve of Maghrafelt in the North of Ireland.

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N Sunday, November 16, 1707. after a frosty morning, and fair still day, wind northwesterly, about half an hour after eight in the evening, there appeared a very strange light in the north. The evening was clear and star-light, only the horizon was darkned with condensed vapours in the north, reaching, I guess, 10 or 15 degrees above the horizon. Out of this cloud proceeded several streams or rays of light, like the tails of some comets, broad below, and ending in points above. Some of them extended almost to the tale of Ursa minor, and all were nearly perpendicular to the horizon, and it was as bright as if the stull moon had been rising in the cloud. But what I wondred at most, was the motion of the dark and lighter parts running strangely through one another in a moment; sometimes to the east, and sometimes to the west. It continued, after I first saw it, about a quarter of an hour, often changing its sace and appearance, as to form and light; sometimes broken, sometimes entire and long rays

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of light in the clear sky, quite separate from, and above the cloud, and none below in the cloud.

An Aurora Borealis at Dublin, by an unknown Hand.

HE afternoon was very calm and serene; about six in the evening the sky was tinged with a strange kind of light, and some streams began to project from the north and northeast. One of them arose about N. by E. and was nearly a subtense of an arch between that and S. W. by W; it was a little curvated toward the sun, and what I saw of it (for the north part of the horizon was conceal'd by houses) very much resembled the tail of a comet: about the same time there was one or two which arose in the east, ascending obliquely so as to leave the zenith several degrees to the northward.

These Striæ continu'd to appear and disappear alternately till toward 8 in the evening; they were pyramidical, and their vertices frequently projected several

degrees to the fouth of our zenith.

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Between 9 and 10 I was agreeably surprized with a kind of coruscation, or flashing, that shew'd it self between 20 and 60 degrees from the zenith, in the south or fouth by west; and which from four or five, sometimes from more places at once, darted with a velocity not much inferior to that of lightning; and by interfering with each other produc'd a beautiful tremour or undulation in that fubtile vapour, which I cannot better illustrate, than by comparing it to the beams of the fun, reflected on a ceiling from the surfaces of two or three basons of water: these waves of light were only visible at the instant of coruscation, and were of a pale whitish colour, somewhat resembling the slasses produced by the violent agitation of quickfilver in an exhausted receiver; but so strong that a gentleman who about that time was in a room by himself, without a candle, assur'd me he took it for common lightning: thus it continued incessantly for more than an hour, during which time several lucid areas, like little clouds, discovered themselves in the pure sky, and after they had continued about five or fix second minutes, as near as I could guess, would instantaneously disappear; most of them pretty much resembled a very thin white smoke or vapour illuminated by the full moon.

About three quarters past 10, this vapour was almost spent, or by a brisk gale at south by west dispers'd and driven to the northward; at which time, between the west and north, a vast body of it, like a very bright slame-colour'd Crepusculum, seem'd to be fix'd: from this basis several beams or Striæ of shining matter were at uncertain intervals emitted; and tho' it was not sensible to the eastward of the north, yet several mighty pillars were also ejected from thence: one, which if I mistake not, arose directly under the pole, was, above all others that had preceded it, both as to its magnitude and density so surprizing, that I'm persuaded the smallest print might have been read by the light thereof, had not that of the moon, which shone very bright, pretty much effac'd it: 'twas ting'd with a kind of yellow and violet colour. In about two or three minutes it died away,

and was succeeded by others of an inferior order: it was now about a quarter past eleven of the clock, and nothing but repeated phases of the same spectacle offering themselves to view; the vibrating motion hath ceased, the vapour shewed it self no longer in lucid areas; the streams of light were not so frequent, and those more languid than before; and the bright Aurora having settled nearer the horizon, I concluded the scene was at an end, and accordingly gave over the quest of new phænomena, with only observing that about N. E. there appeared some clouds that reslected an unusual kind of reddish light. Others, who three a principle of sear sat up longer than I did, represent the end with very surprizing circumstances; but as it escaped the eyes of those who were best qualifyed to oblige the world with an history of it, so I despair of adding any thing that may be satisfactory: and there were no doubt many circumstances of weight that I did not observe: for the wonderful variety this phænomenon afforded, and the frequency and suddenness of its alterations, made it impossible for the eye of any single person to trace it.

On Tuesday the 24th of November, we had the same phænomena repeated, tho' not with the same variety: about a quarter past ten at night, a vast body of shining matter was collected between N. W. by W. and N. by E. in the form of the segment of a circle, whose center was about 25 or 30 degrees below the horizon; from its periphery a few short pyramidical streams, of the same luminous vapour, ascended by a slow and nearly uniform motion, and were exceeding rare so as not to efface the smallest of the fix'd stars; and in a minute or two vanished: it was very remarkable that the light which that collection of vapour emitted was so great, that in the otherwise very dark night, I cou'd thereby (at three quarters past ten) read the title of the last philos. transact, which then happened to lye on my desk; and at four or sive yards distance see the smallest books in my

study.

A Letter of Mr. Francis Nevil to the Right Reverend St. George Lord Bishop of Clogher, R. S. S. giving an Account of some large Teeth lately dugg up in the North of Ireland, and by his Lordship communicated to the Royal-Society.

Belturbet, July the 29th, 1715.

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My Lord,

THE curiofity I here send your Lordship, is so far beyond any thing that I have had the honour to communicate to your Lordship, or that I have ever met with, that I presume your Lordship will think it sit to communicate to the Royal-Society; I have sent the draught, after the best manner I could draw it, enclosed; it is the draught of two teeth lately sound within eight miles of this town at a place call'd Maghery, in part of the bishop of Killmore's lands.

lands, finking the foundation for a mill near the fide of a small brook that parts

the counties of Cavan and Monaghan.

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There are in all four teeth, two of a larger and two of a smaller sort, the largest is the farthest tooth in the under jaw, the other is like it, and belongs to the opposite side; the lesser tooth I take to be the third or sourth tooth from it, and has its fellow: these are all that were found, and one of them in a piece of the jawbone, which fell to dirt as soon as taken out of the earth; there was part of the scull found also of a very large size and thickness, but as soon as exposed to the air, that mouldered away as the jaw had done.

The account I had led me last week to the place, where I was resolved to make the nicest search I could; but the water-wall of the mill being built, and the ground all incumbered with the earth that was thrown up, I could have little opportunity of doing any thing, but to enquire of the workmen the manner of finding the teeth, and where and how they lay. There were some tew pieces of bones sound, but none entire, yet by those bits that were found, one

might guess that they were parts of those that were of a larger size.

The place where this monster lay was thus prepared, which makes me believe it had been buried, or that it had lain there fince the deluge. It was about four toot under ground, with a little rifing above the superficies of the earth, which was a plain under the foot of a hill, and about 30 yards from the brook or thereabout. The bed whereon it lay had been laid with fern, with that fort of rushes here call'd sprits, and with bushes intermixed. Under this was a stiff blew clay on which the teeth and bones were found: above this was first a mixture of yellow clay and fand much of the same colour; under that a fine white sandy clay which was next to the bed: the bed was for the most part a footthick, and in some places thicker, with a moisture clear through it; it lay sad and close and cut much like turf, and would divide into flakes, thicker or thinner as you would; and in every layer the feed of the rushes was as fresh as if new pull'd, so that it was in the height of feed-time that those bones were laid there. The branches of the fern, in every lay as we open'd them, were very distinguishable, as were the feeds of the rushes and the tops of boughs. The whole matter smelt very sowre as it was dug, and tracing it I found it 34 foot long, and about 20 or 22 foot broad.

It will be well worth confideration what fort of a creature this might be, whether human or animal; if human, there was some reason for the interrment, and for that preparation of the bed it was laid on; if animal, it was not worth the trouble: If human, it must be larger than any grant we read of; if animal, it could be no other than an elephant, and we do not find that those creatures were ever the product of this climate. And considering how long this must have lain here, I do not believe the inhabitants then had any curiosity or conveniency to bring such into this kingdom; for I suppose the best of their ships could not carry one. Then if an elephant, or some other beast which must have proportion to the teeth, it must have lain there ever since the flood; and if so, then the bed on which it lay must be of its own making: whence it will follow, that the flood coming on him while he lay in his den, he was there

drown'd, and covered with slime or mud, which since is turn'd into the sub-stance of the earth before mention'd. I forgot to mention that there was a great many nut-shells found about the bed, perhaps those might have been on the bushes which composed part of the bed.

The two large teeth are of equal weight, two pound three quarters each, the two little teeth are fix ounces each; but there are some of them wasted, and

fome of the holders that go into the jaw broken off.

I am,

My Lord,

Your Lordship's most dutiful and obedient Servant,

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FRANCIS NEVIL.

Remarks upon the aforesaid Letter and Teeth, by Thomas Molyneux, M. D. and R. S. S. Physician to the State in Ireland: Address'd to His Grace the Lord Archbishop of Dublin.

My Lord,

HEN your Grace was pleased to communicate to me a letter you received some while since, containing an account of an extraordinary natural curiofity, lately discover'd in the North of Ireland, in the County of Cavan, you defired I would give you my thoughts concerning it, and the purport of the letter: but truly when first your grace gave me the opportunity of perusing this account, and I consider'd the imperfect sketches of the teeth annex'd to it, I was not a little concern'd, that upon the making so surprizing a discovery, could not command a fight of the originals themselves, from whence the draughts were taken; or that so great a curiosity should be exprest by the hand of an artist that shew'd so little skill: however, by the best judgment I could make from so imperfect an information, I told your grace then, I was pretty well convinced they must have been the grinding teeth of an elephant: yet I engaged, if hereafter I might be so lucky as to procure a view of the teeth them telves, I would be more positive in my opinion, and give the reasons on which I grounded my conjecture; as likewise I would have the shape of the teether prest in their full dimensions, by more true and exact figures.

Since that, the four teeth, with some of the fragments of the bones that were found with them, have been brought here to Dublin, where, by the favour and affistance of my ingenious friend Sir Thomas Southwell, I procured the

loan of them, so long as to examine them particularly, make some remarks, and take the following correct sketches, that express their form truly, just as big as the life; and your lordship seem'd well satisfied with the performance of the artist, when at the same time I produced the draughts and the originals from whence they were copied, that we might compare them both together.

Upon the whole, I am now fully convinced, and I can upon sure grounds affirm to your lordship, that they must certainly have been the four grinding teeth in the lower jaw of an elephant: and that the many loose fragments of those large bones that were found with them, must have been remains of the same animal. This I take to be one of the greatest rarities that has been yet discovered in this country.

In order to clear this matter, 'twill be first requisite to have recourse to, and explain the annex'd figures.

Figure the 1st. A. A. is the large grinder of the under jaw on the right side,

weighing two pounds and three quarters of a pound.

b. b. b. b. b. b. b. are white, rough, indented borders, seven in number, of an irregular shape, rising about the tenth of an inch higher than the hard black shining surface of the tooth; this rough raised work serves for the bruising and grinding the animal's food, the tough grains of rize, leaves, fruits and the boughs of trees; and is made of so extream an hard texture, that it resembles large knotted threads of white glass, laid on and closely fastned to the dark superficies of the tooth: and answers that glassy surface wherewith nature has armed the outside of the teeth of most animals, to prevent their wearing from the constant attrition in chewing of their foods.

c. c. c. c. c. is that part of the tooth which rises above the gumms, and continues even now distinguish'd from the rest of the bone, by having its colour

of a different shade.

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d. d. d. d. d. d. d. are many strong tangs or roots, seemingly united altogether, by which the tooth received its sense and nourishment, and tho' it was so

large and ponderous, by these it kept firmly fixt into the jaw.

For the mechanism nature shews it self to have followed in framing the teeth of this animal, is no more than this: whereas in other creatures, she has divided that bony substance wherewith they chew their food, each having its peculiar roots to secure its articulation in the jaw-bone: she has in this of so great bulk (as Pliny the Naturalist stiles it, Terrestrium maximum elephas,) for the greater strength, stabiliment, and duration of its teeth, and the better to provide for a compleat attrition of the aliment, in order to perfect the digestion so thoroughly, as to sustain the life of the animal for two or three hundred years, (as it is a common received opinion in the east) she has, I say, contrived to make the substance of the teeth in their roots below, and in their upper parts above the gumms, closely unite together; and coalescing thus, form a few large massive teeth instead of many small ones.

As for instance, in man's body, that is of so much a less fize, the number of the teeth, (when the whole sett is compleat) reckons to thirty two, whereas in the large elephant, the teeth of both the jaws amount in all but to eight, be-

fides its two great tusks, which rather serve as horns for its defence, than teeth to prepare its food, and therefore I think not to very properly call'd teeth.

Figure the 2d. E. E. is the smaller grinding teeth of the under jaw on the same fide; its furface covered over with the same white indented work, as before describ'd for grinding of the food.

f. f. f. are three large roots that kept it firmly fixt in the jaw-bone. This imaller tooth weighed full fix ounces.

Figure the 3d. G. G. is the large grinder of the under jaw on the left side, much of the fize and shape and weight with its fellow tooth, describ'd figure the 1st. It shews its roots and all its parts, with the rough protuberant white work on its upper furface, made after the same contrivance, and formed after the iame strong model as the former.

And truly if one considers it, 'tis plain, that were not the teeth of this creature made of so large a fize, and withal of so massy and firm a substance, 'twere absolutely impossible they could resist the force, and bear all that pressure wherewith those vast muscles exert themselves, that move the lower jaw in mastica-

tion in this fo strong an animal.

Figure the 4th. H. H. is the smaller grinding tooth of the under jaw on the same side; it is less compleat than the small tooth describ'd before in Figure 2d. for some of the root is wanting, and part of its outward grinding surface is broke off at k. k. so that it weighs somewhat less; yet what remains, exactly shews the same kind of work and shape of the other tooth, that answer'd it

on the right fide.

These four teeth here describ'd, fully compleat the sett of the teeth, wherewith nature has furnished the lower jaw of the elephant; and are answered by just as many more, formed after the same manner in the upper jaw, as Dr. Moulins informs us, who dissected the elephant that was burnt here at Dublin, in 1681. in its anatomy, p. 40. speaking of the teeth, he assures, there were befides the tusks only four teeth in each jaw, two in every fide: and that these eight teeth were all Molares, so that he had no Incisores.

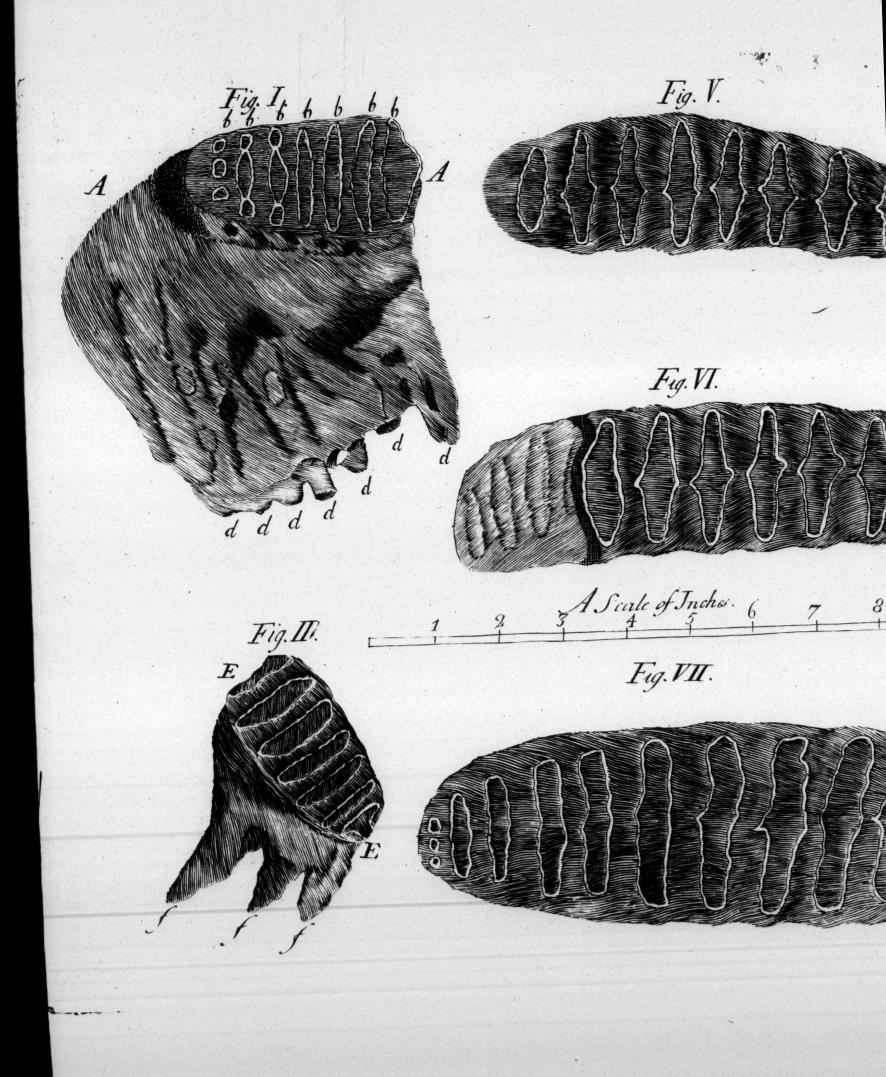
But notwithstanding this, perhaps it will be said, we may not hastily conclude from hence, that our great teeth dug up in Ireland, must certainly have been the four grinders of an elephant, fince they might as well belong to some other large kind of Terrestrial or Marine Animal. As for the hint of their being human or gigantick, 'tis fo groundless a thought, and so contradictory to comparative anatomy and all natural history, it does not deserve our confideration

To obviate this, I shall take notice first in general, that the differing kinds of living creatures, wherewith nature has stock'd the world, are not more distin guished by the make of any part of their bodies from one another, than by the various shape and disposition of their teeth: and hence it is, we shall not find any two distinct classes of animals that do exactly agree in the same make and ranging of their teeth.

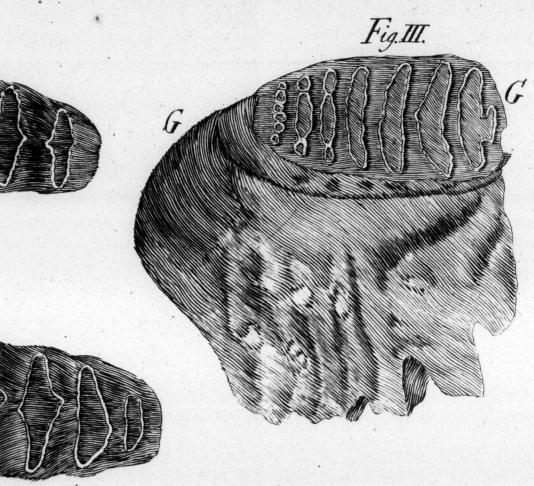
But yet to be more particular, and make this point so plain, I hope, as that it may admit of no controversy, I shall here set down at length, as I find them, the words of two late authors, that purposely have described the teeth of the elephant re te ere re-caon ure ace act-d it d by Moun, in e bethese fome forme to the contraction inds of distinguished the contraction of fine the contraction of the contracti

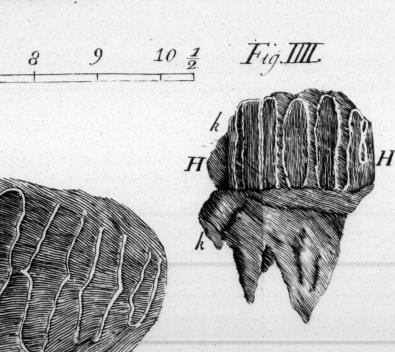
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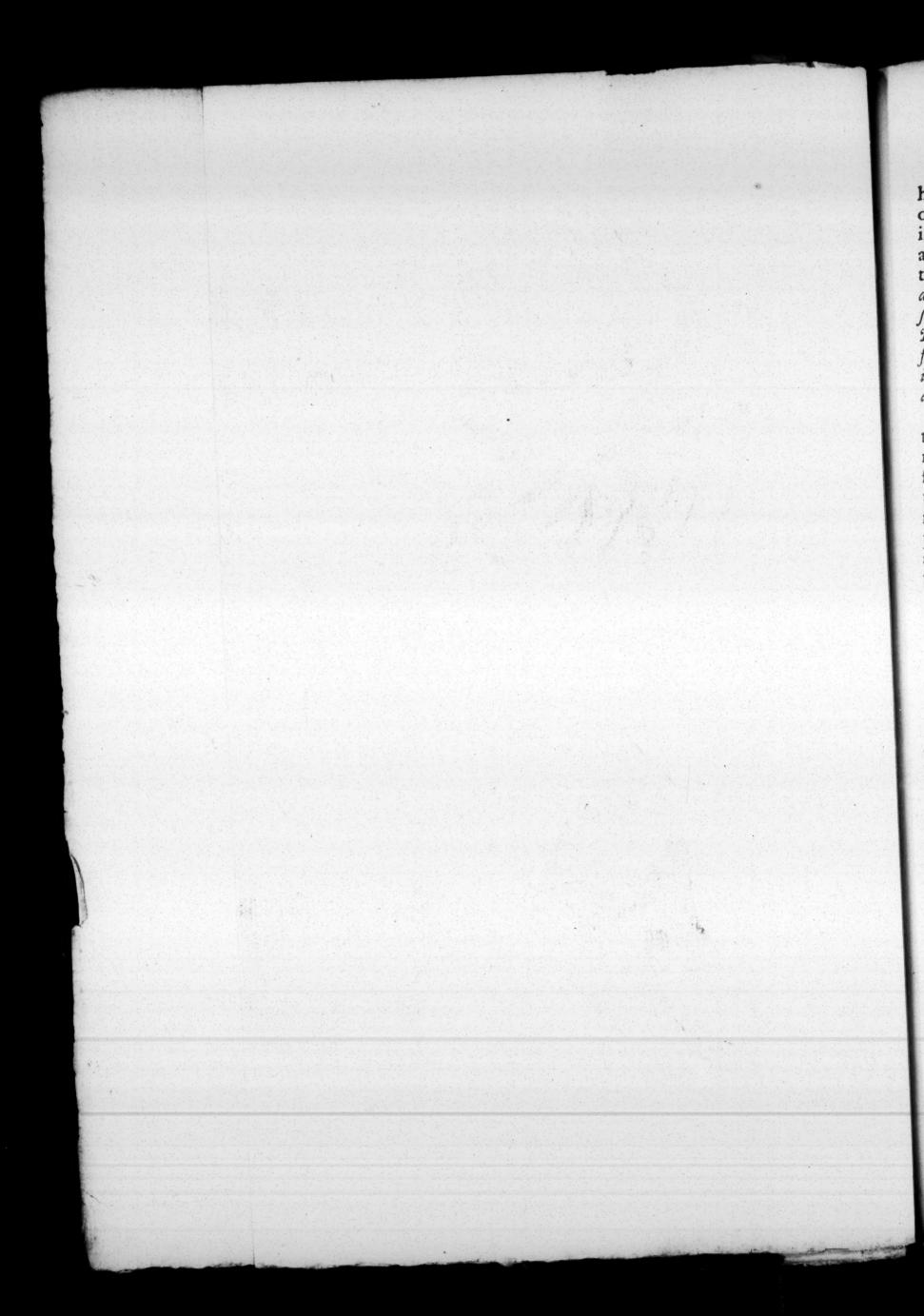
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The first I shall mention is, Mr. Patrick Blair, who has publish'd a Treatise he calls Osteographia Elephantina, or a description of the bones and other parts of an elephant, that died and was dissected near Dundee in Scotland, anno 1706. in the London Philosophical Transactions, for April, May, June, July, August, and September, 1710. Numb. 326 and 327. Here giving us a description of the teeth of this Animal, p. 110. he says, Dr. Moulins well observes that they are all Molares, being two inches broad in that part of them wherewith they grind, and six inches and a half long on the right side, and sive inches and a half on the left. Their surface, tho' slat, is yet very unequal, for they have alternately placed, running from the right to the left side, an hollowness and then an eminence; and this eminence is surrounded by a rough protuberant border. There are nine of these hollownesses and as many eminences, undulated as they paint sea waves.

Tis remarkable how very exactly all this agrees with our figures; 'tis true those hollownesses and eminences, which he mentions to be nine, do not so nicely hit with the number of those in our teeth: but this difference proceeds from hence, that he describes here the grinders of the upper, whereas ours are the teeth of the lower jaw; tho' such a distinction as this, I am apt to think, may very well arise even in those of the same jaw, in various animals, from some peculiar disposition in one from another, nay, and perhaps in the same animal, at differing times, according as it happens to be older or younger, but this by

the bye.

A little farther, p. 114 and 115. where he gives an account of these of the

under jaw, he fays.

The hind tooth of the right side is four inches, and that on the left sive: the one half of their surface, where they begin to appear above the gumms, is semicircular, with the forementioned ridges and Sulci, running transversly, four on the right side and sive on the left, the other half (or tooth I suppose he means) has sive of these eminences where it grinds on the right, and four on the left: each of the four teeth is six inches long, and has six or seven of the forementioned eminences, and as many depressions: these teeth are the most sirm, solid and weighty bones of any animal yet known.

So much from Mr. Blair.

The other author I shall produce for the further illustration of this matter, is the laborious and accurate naturalist Mr. Ray, who, in his Synopsis animalium quadrupedum, when he comes to give us the description of the elephant, has the tollowing words. Os pro mole bellue parvum, quatuor in utrâque maxillà dentibus molaribus seu dentium molarium massis instructum; si quidem plurimi dentes in os solidum & durum ita insixi sunt, ut cum eo & inter se unum & continuum corpus essiciant. Dentes hi lineas parallelas undulatas octo vel novem in superficie masse efficiant; suntque reliquo osse candidiores: Masse integræ, dentium singularium modo, per Gomphosin maxillis inseruntur. Incisoribus omnino caret.

Thus Mr. Ray, in very proper and expressive terms, describes the teeth of this animal: and truly it your grace will but compare Mr. Blair's words with his, and the particulars of both accounts with the description and figures we have before given of the teeth dag up in Ireland, and observe how they all a gree exactly, even so as one may say they tally together, I think it will amount

to nothing less than demonstration, and that all our ideas have been taken from one and the same natural object; and as they, so we, must certainly have described no other teeth but those of the elephant.

But then perhaps it will be ask'd, what is become of all the rest of the teeth that were in the upper jaw, which being as firm and solid bones as those that

are here preserved, might for the same reason have still remained entire.

But fince we find it otherwise, 'tis obvious to imagine a probable conjecture how this might come about. From what Mr. Nevil mentions in his letter, 'tis plain that the bed where all these bones were found, must once have been the outward surface of the earth, the green sod, producing rushes, tern and nuts: and when the heavy beast first sell dead upon this spot, the scull, with all the bones and teeth of the upper jaw, being the highest parts of the animal, might likely sall in such a posture, as to be exposed some while above the earth; tho' those of the under jaw first coming to the ground, might make themselves a bed, and being covered with the mould, remain preserv'd, whilst the upper teeth, and most of the other bones, lying exposed to the injuries of the air and weather, before they got a covering, might rot and quickly moulder all away.

But the this be allowed, yet still a greater difficulty remains unsolv'd; how this large body'd animal, a native of the remote warm climates of the world, should be deposited in this wild Northern Island, (where Greeks or Romans never had a sooting) so many miles from sea, and distant from those places of the

isle where people might most probably resort.

And still to make the difficulty yet greater, we must consider, not only from the dark black colour of the teeth, contracted by their lying long under ground, and the remarkable alteration wrought on their bony substance, which (by the mineral streams and exhalations it has imbib'd whilst it was in the earth) is now become more folid, hard, and ponderous, than it was naturally at first, (nay in fome parts we find it plainly petrified) but also from the perishing of all the other bones of the animal's body, and from the confiderable depth of earth that covered those that were found: we must conclude, I say, from hence, that they have lain in this place for many centuries: I won't say with Mr. Nevil, ever fince the flood, because I can't suppose that the slight texture of vegetable substances, nutts and the seeds of rushes, could possibly have been preserv'd so long: but this, at least, may safely be affirmed, that these remains must be contemporaries with some of the remote ages of the world; which carries us so far back into the earliest times, that we can ne'er imagine the rude inhabitants of Ireland, or any of their neighbouring countries, were malters of lo much art, in those days of ignorance and darkness, as to make carriages by sea strong and capable, or of curiofity and politeness enough, to transport a beast of this large fize from those far distant countries where 'twas bred; which they that now attempt do find a work of vast care, trouble and expence, even in this age, wherein navigation is brought to luch perfection.

These considerations, my lord, grounded on other instances of the like kind, make me inclined to think this elephant we are speaking of, might not be brought hither by any care or industry of man: but the surface of this terraqueous globe

might, in the earliest ages of the world, after the deluge, but before all records of our oldest histories, differ widely from its present geography, as to the distribution of the ocean and dry land, its islands, continents and shores, so as to allow this beaft, and others of its kind, for ought I know, that may by some fuch accident hereafter be luckily discovered, a free and open passage into this country from the continent.

For otherwise, how can we e'er explain that that other vast large stately animal the Moofe-deer, little inferior to the elephant it felf, could have been brought to Ireland, (where eliewhere I have thewn it formerly was common) from diftant north America, even long before that quarter of the world was known, and

is the only region I can hear, where this great beaft is found at present.

And can we well imagine that foxes, otters, badgers, tigers, wolves, with linxes and fuch ravenous animals as we have been told, have lately been discovered by the great inows that fell this prelent winter in the island of Sardinia and other places, should ever be imported (being useless noxious beasts of prey) by the industry of man, to propagate in islands, that they might destroy mens food and flocks, and make their lives not only uneasy but unsafe?

Nay how can we suppose that birds of shortest flight, the various forts of poifonous ferpents, and of offensive creeping vermin, with all the various tribes of smaller infects, could possibly be found in islands, unless they had been stock'd with those inhabitants when the intercourse between them and the continent

was tree and open.

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But in whatever manner this elephant (to return to our subject) might first have made its way for Ireland; this is beyond dispute, that the bones of elephants have been discovered deep under ground, in other places as well as this kingdom: and those too out of the way, far distant from the native countries of this animal.

For not many years ago, in a hill near Erfurt, a town of the Upper Saxony in Germany, leveral parts of the skeleton of an elephant were dug up: on which occasion Wilhelmus Ernestus Tentzelius historiographer to the duke of Saxony, writ a letter to the very learned Antonio Magliabechi, library keeper to the great duke of Florence. This treatise is published, but I have not been so lucky as to procure a fight of it, and know no more but just the title-page Wilhelmi Ernesti Tentzelii historiographi ducalis Saxoniæ epistola, de sceleto elephantino tonnæ nuper effosso, ad Antonium Magliabechium, magni ducis Hetruriæ bibliothecarium.

And I am well perfuaded, by the best construction I can make of those imporfeet and obscure accounts, we have in Evert Isbrand Iddes curious travels t Muscovy to China over land; chap, the 6th. (which he confesses he only gates ed from the barbarous Offiacks inhabitants of that country) concerning the vair teeth and bones and limbs of Mammuths as he calls them, frequently sound and diligently fought after to make profit of them in the hills, and banks of leveral rivers in Siberia, the Keta, Jenize, Trugan, Montgamsea and Lena; that they are nothing else but the remains and skeletons of elephants, buried there, and accidentally discovered by the earth's opening, and falling down on the sudden thaws, after severe long frosts. But of this, please to consult the author, whose wo.ds are too prolix to be inferted here.

But

But to bring this matter still nearer home to our selves, Mr. Cambden in his Britannia is of opinion, that those great monstrous teeth and bones, which he takes notice to have been at several times dug up in many parts of Great Britain, must have been the remains of elephants; but then he thinks, they must be of those that Dion Cassius the historian tells us, the Roman emperor Claudius brought over, when he made his expedition into that island. But that this truly is so, I own is but surmise as yet, and has not been so fairly proved by him or any other,

as that we can rely upon't with satisfaction.

What Mr. William Somner the learned antiquary has published in his discourse of Chartham news is more remarkable; (this is reprinted lately in the philosophical transactions for July 1701. no. 272.) where he informs us, that in the year 1668 in the village of Chartham near Canterbury in England, digging within 12 rods of a river, they found a parcel of strange monstrous bones, some whole, some broken, together with four teeth perfect and sound, each weighing something above half a pound, and some of them almost as big as a man's sist. They are all cheek teeth or grinders; the earth in which they lay being like a sea earth, or fulling earth with not a

stone in it.

'Tis observable how this account in many of its circumstances, agrees with that of Mr. Nevil in his letter to your grace: as that the teeth were all grinders, four in number, found with other large broken bones near a brook, and in a clayey earth, without a stone: but then the weight and magnitude of our largest teeth, so far surpass those that were found in England, that these did not come up to a fifth part of those, which shews they could not be the teeth of the same animal. I must confess the author does not so much as suspect they were elephant's teeth, but on the contrary is of opinion that they belong'd to another species, the hippopotamus or river-horse, a beast that's yet a greater stranger in these parts of the world, than the elephant it self; and therefore its passage hither can never be accounted for, but by some such like supposition as we have made.

However Mr. John Luffkins in his letter, wherein he designs to have reference to that discourse; and which is inserted in the Philosophical Transactions for Sep. 1701. no. 274. disters in his judgment from Mr. Somners about these teeth, which he thinks must have been elephants teeth; as he is positive those large bones he describes in the same letter, and soundnear Harwich in Essex, certainly must have been.

Not having seen, much less examined, any of the bones or teeth concern'd in this controversy; either those that were found in Kent, or those in Essex; I cannot well take upon me to determine any thing in this matter; tho' those dug up at Chartham, as I understand, may still be perused by the curious among the natural rarities of the Royal Society in their repository at London. But this at present I can safely say, that if the figures of the teeth given us by Mr. Somner, and represented in the plate of the foremention'd Transaction no. 272: be genuine and well express (as I have no reason to doubt, as coming from one so skilful and so accurate) they no way seem to agree either in shape or make, or in that particular and characteristick work on the grinding superficies, with the teeth of the elephant; or with the description and figures we have given, which I am sure are both correct and natural.

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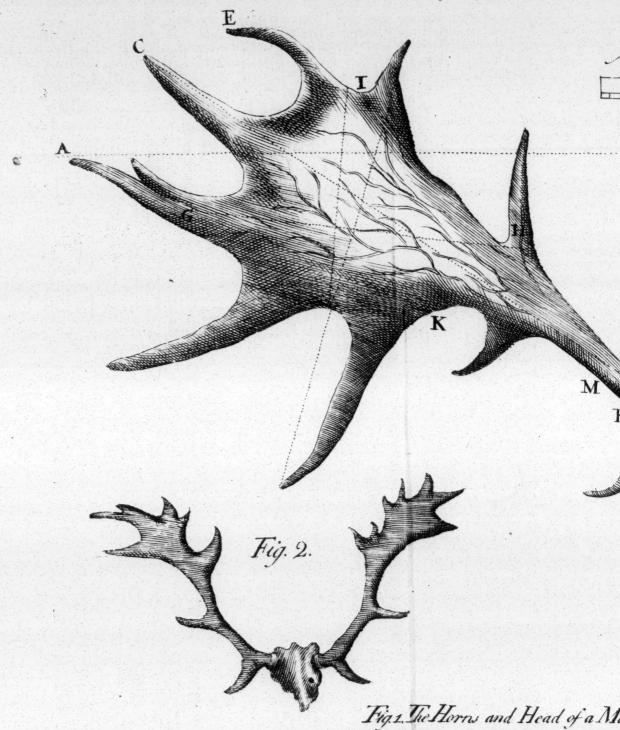
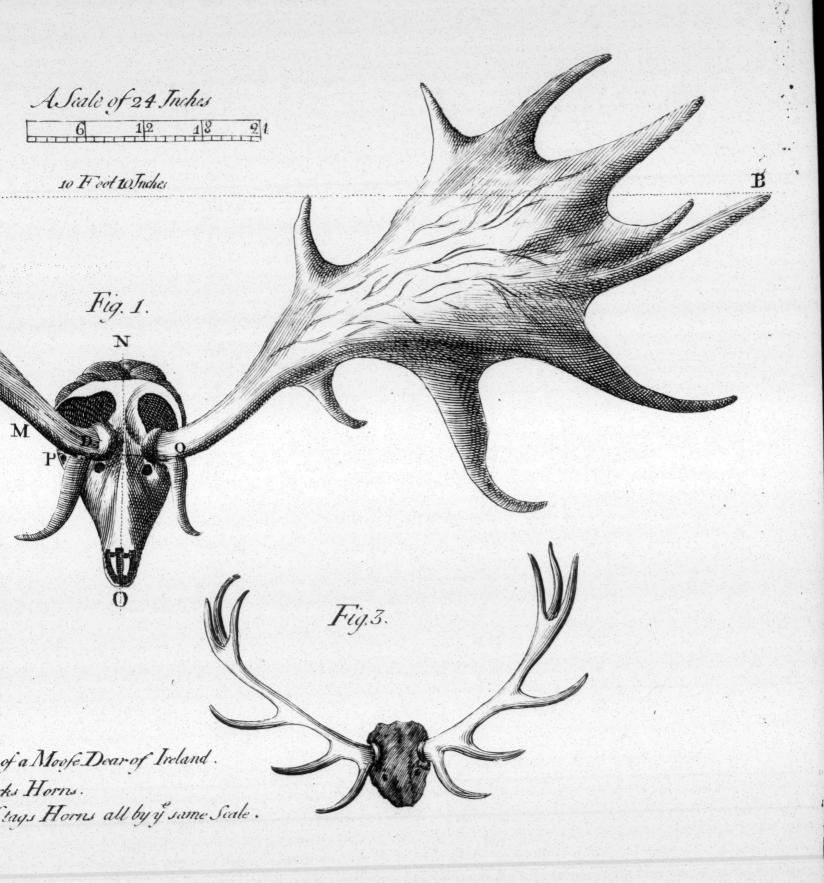


Fig.1. The Horns and Head of a M. Fig.2. Pair of common Bucks Hos Fig.3. Pair of Common Stags F.



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I should now, my lord, make some apology for detaining your grace so long upon what may seem so light and trivial a subject, a piece of meer curiosity: but I am so vain as to hope, whatever others may fancy, it may not appear so in-

considerable altogether to your lordship's more discerning judgment.

For I am inclined to think, (even from these impersect hints) that if we had more correct histories and observations of this kind, made in distant countries, and skilfully registred, with all their instructive circumstances, they might lead us into great and momentous truths relating to the deluge; to the wise methods of providence, in replenishing all regions of the world with animal beings soon after the flood; and to the knowledge of several important changes that may have happened on the surface of this our terraqueous globe: inquiries that are truly worthy the utmost application of the most learned divine and the most sa-gacious philosopher.

But I shall stop here, and only beg leave to subscribe my self, with the utmost

respect,

My Lord,

Your Grace's most devoted

Faithful and humble Servant,

T. Molyneux.

A Discourse concerning the large Horns frequently found under ground in Ireland: concluding from them that the great American Deer, called a Moose, was formerly common in that Island: with Remarks on some other things natural to that Country. By Thomas Molyneux, M.D. Fellow of the King and Queen's Colledge of Physicians in Ireland, and of the Royal Society in England.

HAT no real species of living creatures is so utterly extinct, as to be lost entirely out of the world, since it was first created, is the opinion of many naturalists; and 'tis grounded on so good a principle of providence taking care in general of all its animal productions, that it deserves our assent. However great vicissitudes may be observed to attend the works of nature, as well as human affairs; so that some entire species of animals, which have been formerly common, nay even numerous in certain countries; have, in process of time, been so perfectly lost, as to become there utterly unknown; tho' at the same time it cannot be deny'd, but the kind has been carefully preserved in some other part of the world.

Of this we have a remarkable example in Ireland, in a most large and stately beast, that undoubtedly has been frequent in this kingdom, tho' now clearly ex-

tinct; and that so many ages past, as there remains among us not the least record in writing, or any manner of tradition, that makes so much as mention of its name; as that most laborious inquirer into the pretended ancient, but certainly sabulous history of this country, Mr. Roger O Flaherty, the author of Ogygia,

has lately inform'd me.

What discoveries therefore we make of this creature, we can only have from those loose parts of it we find dug out of the earth by accident, preserved there to many ages from corruption, by lying deep and close under ground, whilst harder and of themselves more durable bodies, moulder away and perish, by being exposed to the various changes of the air, and repeated injuries of the weather.

By the remains we have of this animal, it appears to have been of the genus cervinum or deer kind, and of that fort that carries broad or palmed horns, bearing a greater affinity with the buck or fallow deer, than with the stag or red deer, that has horns round and branched, without a palm: this I lately observ'd, having an opportunity of particularly examining a compleat head, with both its horns entirely perfect, not long since dug up, given to my brother William Molyneux, as a natural curiosity, by Mr. Henry Osborn, that lives at a place called Dardistown, in the county of Meath, about two miles from Drogheda, who writh him the following account of the manner and place they were found in.

I have by the bearer sent the head and horns I promised you; this is the third head I have found by casual trenching in my orchard; they were all dug up within the compass of an acre of land, and lay about four or sive foot under ground, in a sort of boggy soil. The first pitch was of earth, the next two or three of turf, and then followed a sort of white marl, where they were found: they must have lain there several ages,

to be so deep interred. (Thus far Mr. Osborn.)

I took their dimensions carefully as follows; from the extream tip of the right horn to the extreme tip of the left, as exprest in the annext table, figure the 1st. by the prick't line A B was ten foot ten inches, from the tip of the right horn, to the root where it was fastned to the head, exprest by the line C D five foot two inches, from the tip of the highest branch (measuring one of the horns transverse, or directly a-cross the palm) to the tip of the lowest branch, exprest by the line GF three foot seven inches and a half. The length of one of the palms within the branches, exprest by the line GH two foot six inches: the breadth of the same palm, still within the branches, exprest by the line I K one footten inches and a half: the branches that shot forth round the edge of each palm, were nine in number, besides the brow antlers, of which the right antler, exprest by the line D L was a foot and two inches in length, the other was much Morter: the beam of each horn at some distance from the head, where 'tis marked M, was about two inches and fix tenths of an inch in diameter, or about eight inches in circumference; at the root where 'twas fastned to the head, about eleven inches in circumference. The length of the head, from the back of the skull to the tip of the nose, or rather the extremity of the upper jaw bone, exprest in the figure by the line NO two foot, the breadth of the skull where largest, mark'd by the line P Q was a foot.

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The two holes near the roots of the horns, that look like eyes were not so, (for these were plac'd on each side the head in two ample cavities, that could not be well exprest in the figure) but were large open passages, near an inch in diameter in the forehead bone, to give way to great blood vessels, that here iffue forth from the head, and pais between the furface of the horn, and the smooth hairy skin that covers them whilst they are growing, (which is commonly call'd the velvet) to supply the horns with sufficient nourishment, while they are soft, and till they arrive at their full magnitude, so as to become perfectly hard and These vessels, by reason of their largeness and great turgency of the humor in them; whilst the horn is sprouting and pliant, make deep and conspicuous furrows all along the outfide of it where they pass; which may plainly be seen after the horn is bare and come to its full growth; at which time all these veins and arteries, with the outward velvet skin, drying by the course of nature, shrivel up and separate from the horn, and the beast affects tearing them off in great stripes against the boughs of trees, exposing his horns naked, when they are throughly hardned, without any covering at all. This I gather, by what remarks I have made on the skulls of other deer, and what I have observed concerning the growth of these fort of horns in animals of the like kind, tho' not in this particular fort of creature.

The figure I had exactly taken by a skilful hand, to shew truly the right shape and size of these kind of horns we so commonly find here under ground in Ireland; and have likewise added a draught of a pair of common stags horns, exprest figure the second, and another of a pair of common bucks horns, exprest figure the third, all done according to the same scale; that by this means, at one and the same time, may appear the grand disproportion between these sorts of heads,

and also the difference and agreement in their shape. (See the table.)

Such then were the vast dimensions, according to which the losty fabrick of the head and horns of this stately creature was built; and doubtless all the rest of the parts of its body answered these in a due proportion. So that should we compare the fairest buck with the symetry of this mighty beast, it must certainly fall as much short of its proportions as the smallest young sawn, compared to

the largest over-grown buck.

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And yet 'tis not to be question'd, but these spacious horns, as large as they were, like others of the deer kind, were naturally cast every year, and grew again to their sull size in about the space of sour months: for all species of deer, yet known, certainly drop their horns yearly, and with us 'tis about March, and about July following they are sull summ'd again. Of which strange appearance in nature, the learned Gerrardus Johannes Vossius making mention in his excellent book de idolatria, lib. 3. cap. 57. has these words: Ponam inter natura maxime admiranda breviculo adeo tempore tam solida duraque tanta molis cornua enasci (a). And the inquisitive Italian philosopher, Francisco Redi, in his Experimenta circa res naturales, &c. on the same occasion expresses himself thus: Maxima profetto admaturales,

⁽a) That is, I shall reckon it among the most wonderful works of nature, that horns so hard and solid, and of so great a bulk, should grow up in so short a time.

miratione dignum est tantam molem cornuum & ramorum tam brevi tempore quotannis renasci & crescere (b). And if these judicious persons were moved thus with admiration by considering only the yearly falling and sudden growth of these smaller horns of bucks and stags, with which alone they were acquainted, what would they have thought, had they known of these vast and stupendious productions of nature in the same kind.

As there seems to me no small affinity or agreement in the sprouting forth, and branching of deers horns, with the way of growth in vegetables; so I conceive likewise the constant yearly dropping of them, to proceed much from the same caule, that trees annually cast their ripe fruit, or let fall their withering leaves in autumn: that is, because the nourishing juice, say it is sap or blood, is stopt and flows no longer; either on the account 'tis now deficient, being all spent, or that the cavous passages which conveigh it, dry up and cool; so as the part having no longer any communication with, must of necessity by degrees sever from the whole; but with this difference, that horns by reason of their hard material and strong composition, stick fast to the head by their root, seven or eight months after all their nourishment perfectly retires; whereas leaves and fruit, confisting of a much more tender substance and a finer texture of parts, drop sooner from their native beds where they grew, when once the supply of usual nourishment is stopt; this analogy that nature observes in casting the horns of beafts and dropping the fruit of trees, will appear much more evident to any one that will observe the end of a stalk, from which a ripe orange or any such large fruit has been lately fever'd, and the butt end of a cast horn where it fasten'd to the os frontis: for by comparing them together, he shall find so great a congruity in the shape of both, that 'twill be apparent nature works according to the same mechanism in one as in t'other.

Discoursing one day with his excellency the lord Capel, then one of the lord justices of Ireland, an experienc'd and accurate observer of the works of nature. I chanced to mention these large horns: he was very earnest to see them, and so mightily surpriz'd at the sight of their extraordinary bulk, that my brother thought fit to make a present of them to his lordship, which he obligingly accepted; resolving to send them over, as he said, to his majesty king William.

Such another head, with both the horns intire was found some years since by one Mr. Van Delure in the county of Clare, buried ten foot under ground in a sort of marl, and were presented by him to the late duke of Ormond, then lord lieutenant of Ireland, who valued them so highly for their prodigious largeness, that he thought them not an unsit present for the king, and sent them for England to king Charles II. who ordered them to be set up in the horn-gallery at Hampton Court; where they may still be seen among the rest of the large heads both of stags and bucks that adorn that place, but this so vastly exceeds the largest of them, that the rest appear to lose much of their curiosity by being viewed

⁽b) That is, Truly it deserves our greatest wonder that so large a body of horns and branches should sprout up in so short a time, and be renewed every year

in company with this. I am lately informed, these with the other heads are

fince removed to the guard-room out of the horn-gallery.

In the year 1691. major Folliot told me, that digging for marl near the town Ballymackward, where he lives, not far from Ballysbannon in the county of Fermanagh, he found buried ten foot under plain solid ground, a pair of these sort of horns, which he keeps still in his possession.

In the year 1684 there were two of these heads dug up near Turvy, the manfion seat of the lord Barneval, within eight miles of Dublin; that which was most compleat of the two was fixt over the chimney in the publick hall; and

there still remains as an ancient and lasting curiofity to future ages.

Not long fince, a head of this kind with its horns was found near Portumny, the house of the earls of Clanricard, seated on the river Shannon, in the county of Calloway, where it is carefully preserved, and still admired by all that view it.

Such a forehead with two extraordinary beams of these kind of horns, may be now seen faitned against one side of the common hall of his grace Michael lord archbishop of Ardmagh's house here in Dublin; they are both impersect and want their palms, yet by the vast thickness and length of the beams, I judge when entire they much exceeded the size of those I have given the dimensions of above. The primate told me, they were found somewhere in the province of Ulster, and presented to the earl of Esex, then governor of Ireland, who gave them his

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To these I should add many more instances of the like, as those found by the late lord Mountjoy, near his house at Newtown Stewart; and those kept at Stockallen in the county of Meath, for to my knowledge within less than 20 years, above twenty, I may safely say, thirty pair of these fort of horns have been dug up in several places of this country, all found by accident; and we may well suppose vast numbers still remain undiscovered, but to mention any more of them particularly would be tedious, and to little purpose, since these may suffice plainly to shew, this creature was formerly common with us in Ireland; and an indigenous animal, not peculiar to any territory or province, but universally met with in all parts of the kingdom.

For if we draw a line through the several places of this island where these heads have been found, viz. the county of Clare, the county of Dublin, and the county of Fermanagh, omitting those other parts I have mentioned, we shall make a triangle whose shortest side will be in length above an hundred English miles, which is near as large a figure of this fort, as we can well describe in the

map of Ireland.

And besides, we may reasonably, I think, gather; that they were not only common in this country, but by what Mr. Osborn mentions in his letter to my brother, that they were a gregarious animal, as the naturalists call them, or such a fort of creature as affect naturally keeping together in herds; as we see the fallow deer with us, and as 'tis reported of the elches in Sweden, and the rain deer in the northern countries of Europe; for otherwise we cannot easily fancy it should happen, that three of their heads should be all found within the narrow compass of one acre of ground.

That

That these and several others, and indeed I think I may say, all that I have been particularly informed of, though dug up in far distant places of Ireland, should be constantly found buried in a fort of marl, seems to me to intimate, as if marl was only a soil that had been formerly the outward surface of the earth, but in process of time, being covered by degrees with many layers of adventitious earth, has by lying under ground a certain number of ages, acquired a peculiar texture, consistence, richness, or maturity, that gives it the name of marl. For of necessity we must allow the place where these heads are now found, was certainly once the external superfice of the ground; otherwise 'tis

hardly possible to suppose how they should come there.

And that they should be so deep buried as we at present find them, appears to have happen'd, by their accidentally falling where it was soft low ground; so that the horns, by their own considerable gravity, might easily make a bed where they settled in the yielding earth; and in a very long course of time, the higher lands being by degrees dissolved by repeated rains, and washt and brought down by floods, covered those places that were situated lower with many layers of earth: for all high grounds and hills, unless they consist of rock, by this means naturally lose a little every year of their height; and sometimes sensibly become lower even in one age; of which we may see several satisfactory instances related by Dr. Plott in his Natural History of Staffordsbire, Chap. 3. p. 113. as for all such heads that might chance to fall on high or hard grounds, where they could not possibly be covered or defended, these must of necessity rot, perish, and be destroyed by the weather: and for this reason it is, that never any of these horns are discovered in such fort of ground, but always in a light soil,

and in some low part of the country.

By what means this kind of animal, formerly so common and numerous in this country, should now become utterly lost and extinct, deserves our consideration: and feeing it is so many ages past, that we have no manner of account left to help us in our enquiry, the most we can do in this matter is to make some probable conjectures about it; I know some have been apt to imagine this like all other animals, might have been destroyed from off the face of this country, by that flood recorded in the holy scripture, to have happened in the time of Noah; which I confess is a ready and short way to solve this difficulty, but does not at all fatisfy me: For (besides that, that there want not arguments, and fome of them not easily answer'd, against the deluge being universal) if we consider what a fragil, slight and porous substance these and the horns of all deer are, we can't well suppose they could by any means be preserv'd entire and uncorrupt from the flood, now above four thousand years since; and I have by me tome of the teeth, and one of the lower jaw-bones of this creature so perfect, solid, ponderous and fresh, that no one that sees them can possibly suspect they could have been in nature fo many ages past: and therefore it seems more likely to me, this kind of animal might become extinct here from a certain ill constitution of air in some of the past seasons long since the flood, which might occasion an Epidemick Distemper, if we may so call it, or Pestilential Murren, peculipeculiarly to affect this fort of creature, so as to destroy at once great numbers

of 'em, if not quite ruine the species.

And this is not to groundless an affertion as at first it may appear, if we consider this island may very well be thought neither a country nor climate so truly proper and natural to this animal, as to be perfectly agreeable to its temper, since for ought I can yet learn it neither is, nor ever has been an inhabitant of any of the adjacent kingdoms round about us. And besides, the three heads above mentioned, found so close to one another in the country of Meath, and the two near Turvy, seems not a little to countenance this opinion; as if these ani-

mals died together in numbers, as they had lived together in herds.

To this purpose I have met with a remarkable passage in Scheffer's Description of Lapland, Chap. xxviii. speaking of the Cervus Rangiser, an animal that agrees in kind with ours, though it be a quite different sort of deer, he says that whole herds of them are often destroy'd by a raging distemper common among them; these are his words: Est & morbis suis genus hoc obnoxium qui si ingruunt gregem totum solent pervagare & ad necem dare; qua de re Johannes Bureus ita habet in schedis suis, solet interdum rangiseros morbus quidam velut pestis invadere sic ut moriantur omnes lappoque compellatur noves sibi comparare Rangiseros (c). By which we may see what we conjecture in our case, is not meer supposition, but

certainly happens elsewhere to animals of the like kind.

But fince we have an inftance of so destructive a mortality amongst beasts as quite to extinguish a whole species at once, we may think some might have escaped the common calamity; but these being so sew in number, I imagine as the country became peopled, and thickly inhabited; they were soon destroy'd, and kill'd like other venison as well for the sake of food as mastery and diversion. And indeed none of these animals by reason of their stupendious bulk and wide spreading horns, could possibly ly sheltered long in any place, but must be soon discovered, and being so conspicuous and heavy were the more easily pursued and taken by their numerous hunters, in a country all environed by the sea: for had they been on the wide continent, they might have fared better, and secured themselves and their race till this time, as well as others of the same kind have done elsewhere. Of which more hereafter.

Or had those barbarous times been capable of taking care for the preservation of this stately creature, our country would not have entirely lost so singular and beautiful an ornament: but this could not be expected from those savage ages of the world, which certainly would not have spared the rest of the deer kind, stags and hinds, bucks and does, which we still have; but that these being of much smaller size, could shelter and conceal themselves easier under the

covert of woods and mountains, so as to escape utter destruction.

⁽c) That is, this kind of creature is likewise subject to its diseases: which if they seize a flock, goes through them all; concerning which Josannes Bureus has it thus in his papers; sometimes a fort of disease after the manner of a plague, affects the rain deer, so as they all die, and the Laplander is forced to supply himself with new rain deer.

And here I cannot but observe, that the red deer in these our days, is much more rare with us in *Ireland*, than it has been formerly, even in the memory of man: And tho' I take it to be a creature, naturally more peculiar to this country than to *England*, yet unless there be some care taken to preserve it. I believe in process of time this kind may be lost also, like the other fort we were

now speaking of.

It remains we should say something concerning the proper name of this animal, and what species of creature it was to which these stately horns formerly belonged. And I must here needs own, that I have not met to this day with any person, that has spent the least serious thought concerning this matter. So destitute have we been in this place of that inquisitive genius, that in these later ages has so much every where prevailed, in setting the minds of men upon a diligent search after, and making curious and useful remarks on all things that

are truly the admirable workmanship of nature.

I know they are vulgarly call'd by ignorant people, nay, and some of the learned Vulgus in this country, Elches Horns; and that they are so, is an opinion generally received, and satisfies such as talk of them superficially, without further enquiry; and because this is an error that has so universally prevailed, I shall take the more pains particularly to consute it, and I hope clear this point so from all manner of doubt, that for the suture there shall be no surther question made of it again; the mistake, I am satisfied, has only proceeded from hence, that we are in these parts as great strangers to that fort of animal call'd the Alche Elche, or Elenede, as we are to this of our own country, knowing by hear-say only, that 'tis a large beast with big horns; but unless we shall give the same name to two animals vastly different, which is preposterous, and breeds consuston, we must not allow these horns should any longer pass under the name of Elches Horns.

I have seen a pair of genuine Elches Horns brought out of Swedland, and they differed extremely, both in figure and size, from these we have now described: they were abundantly smaller, quite of another shape and make, not palmed or broad at the end farthest from the head as ours; but on the contrary, broader towards the head, and growing still narrower towards the tips end, the smaller branches not issuing forth from both edges of the horns as in ours, but growing along the upper edge only, whilst the other verge of the horn was wholly

plain without any branches at all.

And accordingly the faithful Gesner, in the first chapter of his book de quadrupedibus, has given us the right description of them, where he expresses the figure of the Elche and its horns apart; and speaking of the size of them, he says, Cornua singula libras circiter duodecem appendunt, longitudine fere duorum pedum (d). Whereas the horns we find here in Ireland, are near thrice that length, and above double that weight; though dry'd and much lighter from their being so long kept: But I confess, I say, this only by estimate, not having an op-

⁽d) That is, each horn weighs about twelve pounds, and was in length almost two foot.

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portunity to weigh exactly a fingle horn by it felf, though I'm fure I can't be much out.

Moreover the Elche, as described by Apollonius Menabenus, who had seen many of them, is no larger than a middling horse: these are his own words, as quoted by Aldrovandus: Habet hoc animal crassitiem & proceritatem mediocris & pinguis equi (e). And agreeable to this is the relation given in the memoirs of the Parisian anatomists, who dissected one of them: and I remember Mr. Duncombe, then one of the Lords Justices of Ireland, told me, when he was Envoy in Sweden, he had seen there above a hundred Elches together in a herd, and none of them above five foot high; and if so, we cannot imagine a creature of that small size, could possibly support so large and heavy a head, with so wide and spreading a pair of horns as these we are speaking of; considering that exact symmetry, and due proportion of parts, nature observes in the formation of all the larger and perfecter fort of animals.

We must then look out, and try if we can discover among the various species of Quadrupedes, some other, whose size and description will better agree with this our Irish animal, than that of the Elebe does: and after all our enquiry, we certainly shan't discover any one that in all respects exactly answers it, save on-

ly that lofty horned beaft in the West Indies, call'd a Moose.

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This animal I find described by Mr. John Josselyn, among his New England Rarities, in these words: The Moose deer, common in these parts, is a very goodly creature, some of them twelve foot high, (in height, says another author more particularly, from the toe of the fore-foot to the pitch of the shoulder, twelve foot; in its full growth much bigger than an ox) with exceeding fair horns with broad palms, some of them two fathom or twelve foot from the tip of one horn to the other. That is, fourteen inches wider than ours was.

Another thus describes the manner of the Indians hunting this creature: they commonly hunt the moose, which is a kind of deer, in the winter, and run him down sometimes in half, otherwhile a whole day, when the ground is cover'd with snow, which usually lies here four foot deep; the beast, very heavy, sinks every step as he runs, breaking down trees as big as a man's thigh, with his horns; at length they get up with't, and darting their lances, wound it so, that the creature walks heavily on, till tired and spent with loss of blood, it sinks and falls like a ruin'd building, making the earth shake under it. Thus far what these authors say of the Moose.

I do not know any one that has yet obliged the publick by giving an exact figure of this stately creature, which would be acceptable to the curious, and very well worth the while of some of those ingenious inquirers that go into those parts for the improvement of Natural History: for I take it next the elephant, to be the most remarkable Quadruped for its largeness in the world. However, in the mean time, by the help of the foregoing accounts, we may easily form to our selves a lively and just idea of its figure and size; and if we compare the several parts of those descriptions, with the beasts whose heads are found here

⁽e) That is, this animal is about the height and thickness of a middling horse.

in Ireland; we shall not have the least reason to question, but these vastly large Irish deer, and the American Moose, were certainly one and the same sort of animal, being all of the deer kind, carrying the same sort of palmed horns, which are of the same size and largeness, as well as figure; and the bulk of their bodies corresponding exactly in proportion to the wide spreading of their horns. So that we may securely affert, that Mooses formerly were as frequent in this country, as they have them still in the northern parts of the West Indies, New-

England, Virginia, Maryland, Canada, or New France.

And least we may think this a simul peculiar to the Continent, and not to be found in islands; I lately met with a remarkable passage in John de Laet's French Description of the West Indies, that clearly shews the contrary; which, because it likewise illustrates and confirms what was said before, I'll set down in his own words. Speaking of New England, says he, I'l y a une certaine sorte de Beste frequente en ces Pais que les sauvages noment Mose, de la grandur d'un Taureau, ayant la Teste d'un Dain, avec les cornes larges que muent tous les anns, le Col comme une cerf: il se trouve une grande quantite de ces animaux en une isle pres de la terre ferme appelle des Anglois mount mansel. That is, There is a certain sort of beast common in this country, which the savage Indians call a Moose, as big as a bull (he had not seen I suppose those of the largest size) having the head of a buck, with broad horns, which they cast every year, and the neck of a deer: there are found also great numbers of these animals in an island near the continent, call'd by the English, Mount Mansel.

This may give us reasonable grounds to believe, that as this island of Mount Mansel, must of necessity had some communication with the main land of America, to have been thus plentifully stockt with this fort of beast; so Ireland, for the same reason, must in the many past ages, long before the late discovery of that New World, had some fort of intercourse with it likewise, (though its not easy, I acknowledge, for us at present to explain how) for otherwise I do not see, how we can conceive this country should be supply with this creature, that for ought I can yet hear, is not to be found in all our neighbourhood round about us, nay, perhaps in any other part of Europe, Asia, or Africa: and then its certain, as Ireland is the last or most western part of the Old World, so its nearest of any country to the most eastern parts of the New-Canada, New-England, Virginia, &c. the great tract of land, and the only one I yet know,

remarkable for plenty of the Moofe-Deer.

And we may observe yet farther, That a sort of alliance between these countries of Ireland and the West Indies, appears likewise in other things, of which they partake both in common. For as they on the coast of New-England, and the island Bermudas, gather considerable quantities of Ambergreese, so on the western coast of Ireland, along the counties of Sligo, Mayo, Kerry, and the isles of Arran, they frequently meet with large parcels of that precious substance, so highly valued for its perfume. In the year 1691. Mr. Constantine an Apothecary of Dublin, shewed me one piece of Ambergreese found near Sligo, that weigh'd sifty two ounces; he bought it for twenty pound, and sold it in London afterwards for above a hundred. On the out-side, 'twas of a close compact substance, blackish

blackish and shining like pitch; but when it was cut the in-side was more porous, and something of a yellowish colour, not so grey, close and smooth as the cleanest and best sort of Amber; but like it, speckled with whitish grains, and of a most tragrant sent; I have still a piece of it by me, that weighs above six drams, with several samples of three or sour other sorts of Amber, all sound on that coast of Ireland; some entirely black as pitch, others of a perfect white substance, exactly answering the description of that sort of Amber, Olaus Wormius mentions in his Museum, Page 34. under the name of Ambræ Griseæ nondum maturæ.

Nor is the kind of Whale-fish, that's often taken in New-England, and atfords the true Sperma Ceti, a stranger to the coast of Ireland that respects America. This we may properly, I think, with Dr. Charleton, call the Cetus dentatus, from its large, solid, white teeth, fixt only in the lower jaw; to distinguish it from that species that gives the Whale Bone, most naturally named by
Aristotle in his Historia Animalium Mysticetus, from its bearded, horny Laminæ
in the roof of its mouth: of which kind likewise there have been three or four
stranded in my time; but on the castern coast of this country that regards Eng-

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This Cetus dentatus is faithfully described by Carolus Clusius, in his sixth book of Exotics, Chapter the 17th, under the name of Cete, aliud admirabile; and truly sigured by Johnstonus in his Historia piscium, Table the 42d. and by Mr. Ray, in his Ichthyographia, Table the 1st. but by both under the too general name of the Balena. There have been three of this kind taken to my knowledge, in the space of six years, all on the western coast of this country; one near Colrain, in the country of Antrim; another about Ship-harbour, in the country of Donnegal; and a third in August, 1691. seventy one foot long, exceeding that described by Clusius, nineteen foot, towards Bally-shannon, where

Lough-Erne discharges its waters into the western ocean.

And then it was, I had an opportunity of truly informing my felf what fort of substance Sperma Ceti is, and in what part of the whale 'tis found : concerning which matter, physicians and naturalists have given the world such various and false accounts; and 'tis truly nothing else, but part of the oyl or liquid fat of this particular fort of Whale; which oyl, at first when confused and mixt, shews it self like a whitish liquor, of the consistence and colour of whey; but laid by in vessels to settle; its parts by degrees separate; that which is lighter, and swims a top, becomes a clear oyl pellucid like water, serviceable for all the uses of common train-oyl, got out of the blubber of other Whales, and that which subsides, because 'tis heavier and of a closer consistence, candies together at the bottom, and is what is fold for Sperma Ceti, at twelve shillings the pound; when 'tis thoroughly blanched and refined from all its filth and the remaining parts of the oyl, that otherwise discolours it, and gives it a rancid offensive sent. Of this substance several hundred pound weight may be gotten out of one Whale, but the cleanfing and curing of it is troublesom, and requires no small art, time and charge; which occasions the value of that which is throughly refined: the T 2

fat of the whole body affords it, but that of the head gives the greatest quan-

tity and purest Sperma Ceti.

I have some reason to believe to these instances of the Moose-deer, Amber-greese and Sperma Ceti, of which Ireland partakes more than any other country of Europe, from its neighbourhood with the Northern America, we may like-wise add some of our more rare spontaneous plants, because they are found growing only in those western parts of Ireland, and no where else in this whole coun-

try, or any of the neighbouring kingdoms about us.

I shall mention but two or three of many which I have been told are peculiar to those parts, because I am not yet well assur'd of the certainty of the others being fo: and those are the Arbutus five Unedo, or the Strawberry tree; not to be found any where of spontaneous growth nearer than the most southern parts of France, Italy and Sicily; and there too, 'tis never known but as a frutex or shrub: whereas in the rocky parts of the county of Kerry about Loughlane, and in the islands of the same Lough, where the people of the country call it the Cane Apple, it flourishes naturally to that degree, as to become a large tall tree. Petrus Bellonius in his first book of Observations, Chapter the 43d, takes notice, it does so in mount Athos in Macedony; and Juba is quoted by Pliny in the fifteenth Book of his Natural History, Chapter the 24th, as mentioning a thing extraordinary, for faying the Arbutus grows to a high tree in Arabia; the trunks of those in Ireland are frequently four foot and a half in circumference, or eighteen inches in diameter, and the trees grow to about nine or ten yards in height; and in such plenty that they now cut them down, as the chieffewel to melt and refine the ore of the filver and lead mine, lately discovered near the castle of Ross, in the county of Kerry.

The other plant I shall take notice of is Cotyledon, sive sedum serratum latisolium montanum guttato slore Parkinsoni & Raii, vulgarly call'd by the gardners, London pride: I suppose because of its pretty elegant slower; that viewed near at hand and examined closely, appears very beautiful, consisting of great variety of parts: the whole plant is most accurately described by that prosound naturalist Mr. Ray, in his Historia plantarum, Page 1046. where speaking of the place where it grows, he has these words: Planta in hortis nostris frequentissima est, ubi tamen sponte oritur nobis nondum constat, est autem proculdubio montium incola (f). Though he knew no certain place where it grew spontaneous, not having met with it in all his travels; nor any author mentioning its native country, yet he rightly conjectures 'tis a mountainous plant, for it grows plentifully here with us in Ireland, on a mountain call'd the Mangerton in Kerry, six or seven miles over, and reputed the highest in Ireland, two miles from the town of Killarny, and four miles from the castle of Ross: Here it spreads it self so abundantly, as to cover great part of the mountain, and for as much as I under-

stand, like the Arbutus, 'tis peculiar to this county alone.

⁽f) That is, 'tis a plant common in our gardens; but where it grows naturally is not as yet known to us, but certainly 'tis an inhabitant of the mountains.

Whether

Whether both the foregoing plants are truly American, I cannot at present determine, but this I know, that Sabina vulgaris, or common savin is mentioned by Mr. Josselyn, in the book before quoted, as a plant common on the hills of New England; and I have been assured by an apothecary of this town, that he has gathered savin growing wild as a native shrub in one of the islands of Lough-Lane, in the county of Kerry; and if so, I have reason to believe, that hereaster farther inquiry may add to these I have given, several other examples of things

natural and common to that and this country.

But to leave these digressions and return to our large Irish deer, which well deserves we should assix to it some characteristick note or proper name, whereby it may stand ranged hereaster in its right place in the history of animals: since nature her self seems, by the vast magnitude and stately horns she has given this creature, to have singled it out as it were, and shewed it such regard, with a design to distinguish it remarkably from the common herd of all other smaller quadrupeds. Naturalists have raised much dispute what beast it truly is, that has had the name given it by some of them, of Animal magnum; Dodonæus, Menabenus, and others, would have it the elk; Scaliger would have it the Bisons of Pliny, whether 'twas one or t'other, or neither, I shan't determine; nor do I the least suspect that this our animal was meant by it; however, for its goodly size and losty stature, and to retain something of an old appellation, I think it may very well lay claim to it, and not improperly be call'd, Gervus platyceros altismus; sive animal magnum cornibus palmatis, incolis Nova Anglia & Virginia, ubi frequens, Moose dictum.

Extract of the Minutes of the Philosophical Society at Oxford, March 18. 1683-4. concerning Irish Slate.

Thaving been discoursed to us about nine or ten months since, by the ingenious Mr. Kenwrick, physician at Worcester, that the Tile of nious Mr. Kenwrick, physician at Worcester, that the Irish slate pulveriz'd, and infus'd in water for a night, or less, would impart its vitriolick quality so far forth to it, that it would strike of a faint reddish colour with pouder of galls (as the vitriolick waters of Tunbridge, Astrop, and divers others do, and as you see it has in some measure done in the example here before you) it not only led me to believe that these waters, some of them, might as well issue from slate as an iron ore; unless it should appear, that this fort of flate were an iron ore too, which put me upon calcining it for three or four hours after the manner of Dr. Lifter, to experiment, whether it would then (like the other iron ore) apply to the magnet; wherein tho' I was altogether unsuccessful, the magnet not taking the least notice of it, yet it afforded me another discovery altogether as satisfactory, which is the matter I have at present to communicate to you; viz. that upon torrefaction it was all become a yellow oaker, and would fcore like it; tho' this here I have to shew you, be grown a little too dark by much burning, which further persuades me, that the yellow, or rather orange-colour'd sediment we find at the bottom of these fountains, comes rather from this fort of flate, than

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an iron ore; for I much question whether some of the yellow oakers (tho' it's plain the red ones do) come from, or are, iron ores; but I intend to calcine this further the next week, whereof you shall have an account the next meeting, but doubt of my success, because the Shotover yellow oaker will not own the magnet, after 36 hours calcination, or better.

An Extract of a Letter from Francis Nevil Esq; to the Lord Bishop of Clogher, F. R.S. concerning a Quarry of Marble discovered by him in the County of Fermanagh in Ireland.

Belturbet, October 14. 1712.

My Lord,

MR. Cole and I were lately in the mountains, where I had discovered a marble quarry. The country wherein it lyes is so strange for the natural wonders in it, that 'twould make a little history to describe all that is to be seen. It lies on the north side of Calcagh, in the parish of Kilasher, and county of Fermanagh. There are marble rocks, whose perpendicular height is 50 or 60 feet, discovered by subterraneous rivers, which, by degrees, have wash'd away the earth and loose stones, and discovered these mighty rocks. There are many great pits faln in on the sides of the great mountain; several of them in a small compass of ground, so that it is dangerous travelling near them. There are many caves form'd, some very large, the sides and arches of marble; some of a liver colour, varied with white in many little sigures; some of a light blue varied with white; but I could find no entire white or black among them.

Part of a Letter from Sir Richard Buckley, S.R.S. to Dr. Lister, concerning the Gyant's Causway in the County of Antrim in Ireland.

Old Bawn, April 24. 1693.

Concerning the Gyant's Causway. Prolixity in a philosophical description I'm sure you'll pardon; for I was very exact in getting it from a person that was rei compos, perhaps peritus; a scholar (a master of arts in Cambridge) and a traveller, who went on purpose the last summer with the present bishop of Derry to see it. It is in the county of Antrim, about 7 miles east of Colrain, and 31 miles to the east of the mouth of the river of Derry. The coast there is a very great height from the sea, but rising gradually on the land-side to the edge of the precipice, it is all cover'd with excellent sweet grass; when you come to the precipice, there is no going down there it is so perpendicularly steep, but with much labour and some hazard it may be climb'd up. By other ways

and windings one comes down to the strand; in which, from the foot of this precipice, there runs out northward into the main ocean, a raised causway of about 80 foot broad, and about 20 foot high above the rest of the strand; its sides are perpendicular, it went on above 200 foot to the sca-water; that is, it was so far in view; but as he was there told, it did not advance much farther, under the superficies of the water. This whole causway consists all of pillars of perpendicular cylinders, hexagons and pentagons, of about 18 and 20 inches diameter, but so justly shot one by another, that not any thing thicker than a knife will enter between the sides of the pillars. The pillars do not consist of joints, as you were inform'd, but each cylinder is one folid piece, only indeed in breaking it breaks cross-ways or horizontally, and not length-ways, which we commonly call splitting; and it is by its thus breaking, that the texture of the middle of the causway is discovered; for pieces have been broken from many of the cylinders that are in the middle, (pieces of unequal lengths) whereby one fees (so deep) the perpendicular fides and edges of the circumjacent cylinders. Pardon the impropriety of the word.

That the cylinders do not confift of joints, is manifest from this, that the pieces so broken off, have their bottoms as often convex or concave as flat and even; and many such pieces there are lying loose upon the sand of the shore, which the sea has washed down from it. When one walks upon the sand below it, the fide of this causway has its face all in angles, the several cylinders having some two, some three of their sides open to view. This gentleman, tho' he had no notion of Astroites, yet believes them all to be natural, because there is no other fort of stone or rock there: nay, that very vast high precipice does consist all of cylinders; tho' fome shorter and some longer (whereby you may now understand it not impossible to climb it up, as by steps, tho' irregular ones) and all the stones that one sees on that coast, whether single or in clusters, or that rise up any where out of the fand, are all cylinders, though of never so different angles; for there are also four-squared upon the same shore. This causway runs out into the northern ocean, having no land over against it any where. This is all I can now tell you of it, and from this imperfect description you may form what queries you think fit. I dare not promise you that I shall go to see it this summer (it being full sevenscore miles off) tho' I have a great temptation as well as defire so to do; but if I do not, I can get your queries well answered upon the place.

The Gyant's Causway, by Dr. Sam. Foley.

THE Giant's Causway is somewhat more than 8 English miles northeast from the town of Colrain, and 3 from the Bush mills, almost directly north. It runs from the bottom of an high hill into the sea, no man can tell how far, but at low-water the length of it is about 600 foot, and the breadth of it, in the broadest place 240 foot, in the narrowest 120 foot. It is very unequal likewise

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likewise in the height, in some places it is about 36 foot high from the level of

the strand, and in other places about 15 foot.

It consists of many thousand pillars, which stand most of them perpendicular to the plain of the horizon close to one another, but we could not discern whether they do run down under ground like a quarry or no. Some of them are very long and higher than the rest, others short and broke; some for a pretty large space of an equal height, so that their tops make an even plain surface, many of them imperfect crack'd and irregular, others entire, uniform and handsome, and these of different shapes and sizes. We found them almost all pentagonal or hexagonal, only we observ'd that a few had 7 sides, and many more pentagons than hexagons, but they were all irregular: for none that we could observe had their sides of equal breadth; the pillars are some of them 15, some 18 inches, some 2 foot in diameter, none of them are one entire stone, but every pillar consists of several joints or pieces, as we may call them, of which some are 6, some 12, some 18 inches, some 2 foot deep.

These pieces lie as close upon one another as 'tis possible for one stone to lie upon another; not jointing with flat surfaces, for when you force one off the other, one of them is always concave in the middle, the other convex. There are many of these kind of joints, which lie loose upon some part of the causway, and on the strand, which were blown or washed off the pillars. These joints are not always plac'd alike, for in some pillars the convexity is always upwards, and in others it stands always downwards. When you force them as under, both the concave and convex superficies are very smooth, as are also the sides of the pillars which touch one another, being of a whitish free-stone colour, but a siner closer grit; whereas when we broke some pieces off them, the inside appear-

ed like dark marble.

The pillars stand very close to one another, and tho' some have 5 sides, and others of them 6, yet the contextures of them are so adapted, that there is no vacuity between them; the inequality of the numbers of the sides of the pillars, being often in a surprizing and a very wonderful manner, throughout the whole causway, compensated by the inequality of the breadths and angles of those sides: so that the whole at a little distance looks very regular, and every single pillar does retain its own thickness, and angles and sides, from top to bottom.

Those pillars which seem to be entire as they were originally, are at the top flat and rough, without any graving or striate lines; those which lye low to the sea, are washed smooth; and others that seem to have their natural tops blown

or wash'd off, are some concave, and others convex.

The high bank hanging over the causway on that side which lyes next it, and towards the sea, seems to be for the most part composed of the common fort of craggy rock only we saw a few irregular pillars on the east side, and some farther on the north, which they call the Looms, or Organs, standing in the side of a hill; the pillars in the middle being the longest, and those on each side of them still shorter and shorter: but just over the causway we saw as it were the tops of some pillars appearing out of the sides of the hill, not standing, nor lying stat, but sloping.

We suppose each pillar, throughout the causway, to continue the same to

the very bottom, because all that we saw on the sides were so.

N. B. The several sides of one and the same pillar are as in the planes of chrystals, of very unequal breadths or lengths, call it either, when you measure them horizontally; and that in such as are hexagonal a broader side always subtends, or is opposite to, a narrower, which fort of geometry nature likewise observes in the formation of chrystals.

A Letter from Dr. Thomas Molyneux, to Dr. Martin Lister, Fellow of the Colledge of Physicians, and of the Royal Society, in London: containing some additional Observations on the Giant's Causway in Ireland.

D Is Is I have been under an obligation by a promise he made in my behalf, that I should send you a more true and particular account of the Giant's Causway, than has been yet published: and indeed had I been in circumstances that would have duly qualified me for the performance of this task; the returns I owe for the great civilities you shewed me when I was in England, were ingagements sufficient to have made me ready, ere now, and extreamly willing to imbrace an

occasion, so luckily put in my way, of gratifying your curiofity.

But I defer'd hitherto giving you this so small a testimony of my thanks, by reason I was still in hopes, that one time or other, some convenient opportunity would present, that I might take a journey into those parts of the country where it lies, and so be able to discharge my self of this office more to my own as well as your satisfaction; for being an eye-witness of this rare and surprizing piece of nature's inanimate workmanship, I might by a more diligent search and ocular inquiry, correct some mistakes and oversights I find committed by those that have already described it; and add to their observations such farther remarks as might render the image and notions we have of the Giant's Causway, still more compleat and circumstantial.

And truly whoever takes a pleasure or satisfaction in making inquiries after natural productions, and examining the various works of the creation, cannot but be very desirous if he has once heard of this fossil, to be as fully informed of it

as 'tis possible, being 'tis so remarkably singular and curious in its kind.

For if we consider how admirable it is, either for its angular and regularly shaped columns; or for the long series of so many exact joints in each of them; or for the neat and curious articulation of these joints one into the other; or for the vast height, straitness, and magnitude of some of the pillars, or for the great variety as well as accuracy of their geometrical figures; or for the strange combination of their sides, in such a manner as there is not the least vacuity or space lest between one column and another, they stand so close together; or for the vast quantity and spacious extent of this sort of rock, which tho' it is sound in such an abundance in this part of our country, none of just the same kind, for ought I can yet hear, is to be met with in any other part of the world: consi-

confidering I say, all these particulars, the Giant's Causway of Ireland may very well be esteemed one of the greatest wonders, nature, or the first cause

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For tho' 'tis true she has manifested much greater artifice and more curious contrivance in the framing of animal bodies, and those of vegetables; as if these were designed to be more elaborate because more obvious and exposed to view and observation; yet in the modeling of her minerals that lie retired, more hid and concealed in the bowels of the earth, we shall not find she has shewn any where so much accuracy and mechanism, as in the shaping the materials of this

our Causway.

However my affairs have so unhappily fall out, and I have had so little command of my own time of late, that hitherto I have been forced to deny my self the satisfaction of going to view this so curious a natural rarity in the country where 'tis situated, and not being able to foresee or promise my self when it might be otherwise, I would not on this score delay any longer answering your expectations, and quitting my self of the ingagements I lie under; but resolved at the distance I am, to inform my self as well as I could concerning it, and then send you the best account I could gather from all my intelligence; which I hope will not be altogether unsatisfactory.

Tho' I have collected from several informations by me, many remarkable passages concerning this strange pile of stony columns, yet I shall only here set down such particulars as have come to my knowledge since my writing of those papers published in the Philosophical Transactions, numb. 212. to which I refer you, as well for the rectifying some errors therein mentioned, as to avoid unnecessary re-

peating what has been already faid on this subject.

Perceiving then I could not so well rely on the draught of the Giant's Causway that was first taken, and printed about four years since in the forementioned Transaction, as being done by the hand of one who was no extraordinary artist, tho' the best that could be then had; I proposed the last summer to some philosophical gentlemen here in Dublin, that we should employ, at our common charge, one Mr. Sandys, a good matter in designing and drawing of prospects, to go into the north of Ireland, and upon the place take the genuine and accurate figure of the whole rock, with the natural posture of the hills and country about it for some distance, accordingly we sent him away with such instructions as I drew up for him, and he returned foon after with a fair and beautiful draught very expressive of each particular we desired; an exact copy of which my brother lately fent over to the royal Society, by one of their worthy members, and my highly esteemed friend, the honourable Francis Roberts, when he went last from hence, this I believe you'll find hanging up in their repository at Gresham colledge, to which I must desire you to have recourse, for the whole map was too large and bulky to be inclos'd in this letter *: however, I have severed from it one of its most instructive schemes, as being the chief and most essential part

A Figure of this is printed, Numb. 235, of these Transactions.

of it all, and have here sent it you; from whence with the help of the description already published, you will easily frame to your self a just idea of the most singular and remarkable properties of this stone of the Giant's Causway.

See the Table.

Here you have exprest by the same scale, all the various sigures of the several sorts of joints and columns that have been found by late careful observation to make up the causway.

Figure 1. shews a joint but of three fides.

Figure 2. a joint of four fides. Figure 3. a joint of five fides. Figure 4. a joint of fix fides. Figure 5. a joint of feven fides.

Figure 6 and 7. two joints one of a smaller, t'other of a larger size, that have

both eight sides.

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Figure 7, and 7. a piece of a column of fix fides transversly divided in the middle, the uppermost part a. laid close by the lower part b. that the manner may the better and more plainly appear how the convexity or rising of the joint below markt c. was let into the hollow of the joint above markt d. when that was in its native posture standing a top and covering it, by this fort of articulation the several joints of the columns, whether they consist of 3, 4, 5, 6, 7, or 8 sides, adapt and unite themselves to one another, observe in all the rest of the sigures c. denotes a convexity or rising, d. a cavity or hollowness in the stone.

Figure 8, and 8. is a collection of feven columns as they stand together in the causway, and shews that the pillars differ from one another in their shape and angles, yet they adjust their sides in such a manner to the next immediate adjoining columns, that there remains no vacuity between them, for the pillars are of such various sigures, that all sorts of interstices of what shape soever, are

intirely fill'd up by one or other of them.

e.e.e.e.e.e. The sides of the pillars which shew by their outward surface, that each column consists of many joints placed one above another from top to bottom; and these joints so closely contiguous, that only a small crevice or line seems to sever them; some with their convexities uppermost as those markt c. others

with their concavities as those markt d.

These figures make out there was a mistake committed as well in answering one of the queries relating to this causway, as in the account that's given of it; where 'tis said, that among the columns there are none square but almost all pentagonals or hexagonals, only a few are observed that have seven sides, but more pentagons than hexagons, whereas 'tis certain, there are not only in this pile quadrangular, but also triangular and octangular pillars, though no notice was taken at that time of any such, by reason they are much sewer in number than those other sigured columns, and not being carefully searched after, they did not come so readily in sight, and my very honoured friend, Dr. St. George Ash, now lord bishop of Clogher, assured me, that when he was upon the causway, he could not

by all his observation, though he examined the matter strictly too, discover there

were more pentagons than hexagons.

But this fort of stone is not more remarkable for being cut thus naturally into regular geometrical figures, than for being found in such plenty and vast abundance in many parts of this country, for four or five miles about. Other curiously shaped stones as the Trochites, the Astroites, the Lapides Judaici, the Echinite pellucidi, and such like, wheresoever discovered in the world, are always but sew in number, and only met with in small parcels, scattered and dispersed up and down: but nature has framed such an immense quantity of this prodigious stone here altogether, that she seems more than ordinary prosuse of her elabo-

rate workmanship.

For besides what goes under the vulgar name of the Giant's Causway, which it self alone is of a great extent, at least seventy five foot longer than what 'twas sirst said to be, and how much farther it may run into the sea, none can tell; there are many other collections of the same kind of pillars, situated in and about this place, as two lesser but more impersect and broken Causways, as we may call them, that both lie at some distance o'the lest hand of the great one, as you sace the north: and a little farther into the sea, some rocks shew themselves above water, when the tide is low, that seem all made still of the same stone. And if you ascend towards the land in the hill above the causway next and immediately adjoining to it, you meet with more of the same fort of pillars, but in a different situation, not perpendicular and erect, but lying as 'twere on their sides, in a slanting posture.

Beyond this hill eastward, at several distances stand many sets of streight and upright columns ranged in curious order along the sides of the hills: that parcel of them which is most conspicuous and nearest the causway the country people call, the Looms or Organs, from its formal shape; which is so very regular, that all its several pillars may be distinctly counted, and they are just fifty in number, the largest and tallest at least forty toot high, consists of forty four distinct joints, and stands directly in the middle of all the rest, they gradually de-

creasing in length on both fides of it, like organ pipes.

Four miles westward of the Giant's Causway, a mile and a half distant from the sea, three miles from the town of Colrain, and about two from Dunluce, an old seat of the marquesses of Antrim; several ranges of tall pillars shew themselves alongst the side of a rock for about three hundred paces together: a church within a quarter of a mile of them, called, Ballywillan church, I am told was built for the most part with stone taken from these pillars, which are all of the same sort of stone with the columns of the Giant's Causway, (as I find by carefully examining and comparing together pieces of them both I have now by me) and like those too, consist of regularly cut, loose, and distinct joints, placed one upon the top of t'other, but in these respects they differ:

1. That some of these inland pillars are of a much larger size than any in the

caulway, being two foot and a half in diameter.

2. That there are only found among these such as have three, four, five and six sides, none that have seven and eight like some of the Giant's Causway.

3. That

ticulars

3. That the joints of these do not observe that kind of articulation by cavities and convexities as those of the causway do, but their upper and lower surfaces touch only in planes, and they stand united by means of their weight and pressure alone, so that a small force will sever them.

Whether these particulars may be thought sufficient to constitute a specifick difference, or only an accidental variety between the stone of the Giant's Causway, and of these more inland pillars, I leave to your greater experience in

these inquiries to determine.

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But in the mean time I must not omit informing you, that notwithstanding those regular cavities or risings, you see exprest in the middle of every one of the joints of the causway, described in the foregoing table, and though I have been affured by several that have been upon the place, that the like hollows and convexities are in the original stones themselves; yet I find by observing the manner of the commissure or way of articulation in fix couple of the leveral forts of joints of three, four, five, fix, leven, and eight fides, which I had railed on purpole, and taken out of the caulway, as they were there naturally fellow'd in pairs, and was at the charge of having them fent hither to Dublin, that I might have a compleat set and sample of all the various columns the Giant's Causway affords; I fay, observing of thele, I find some of the joints actually want this cavity and rifing, as those of 4 and 6 sides I have now in my house, and are only united to another by superficies touching close in planes that run a little slanting and not parallel to the horizon. Yet this may be only a chance formation, fince the universal jointing of the whole causway, is certainly otherwise; but I must take notice, that the hollows and convexities are not constantly formed and moulded in the stone with all that accuracy and circular exactness the artist has pleafed to express them in the figures.

These cavities in such joints as are uppermost, and lye exposed to the open air on the surface of the causway, afford no small use and advantage to the poorer fort of the people in the neighbouring country, with whom it is a common practice in the summer time, when they want salt, to fill these natural basons with sea water, which by reason of their shallowness are of so commodious a shape, that in the space of four tides they find all the water that was lest in them exhalled, and the salt remaining dry in the bottom of the hollows. Yet whether some intrinsick principle in the nature and body of the stone may not contribute a great deal, as well as the outward figure of its cavity, to such a sudden evaporation of the water, and christalisation of the marine salt, in so cold and northern a

climate as this is, I leave to be further confidered.

But there is another irregularity I must take notice of, which is, that one of the joints of the causway a pentagon sent me hither to town, is cavous, both at top and bottom: and I am told, among the other figured joints likewise, there are often found those that are convex as well at top as at bottom: but the general formation that's most constant, and runs through almost all the pillars of the causway, agrees with what is said in the forementioned transaction, viz. That if a joint be concave at one end, the other end is always convex. And bating these par-

ticulars I have hinted, I do not fee any thing else said in that account that you

may not fafely rely on.

The vast towering height of these strait jointed pillars, especially of those that are most stender and the perfectest among them, is truly very surprizing, and delerves yet a more particular regard. There are in the causways, some of thirty two, others of thirty fix foot high above the strand, and as I said before, iome among the organs equal forty foot in height: how far these may be continued under ground is not yet discovered, nor has it been so well examined as it ought: A gentleman of my acquaintance in those parts, did me the favour lately to trace one of the tallest pillars of the causway, by digging into the strand till he could well go no farther; and it continued still of the same make and figure, jointed as it was above, for the depth of eight foot together, and could he then conveniently have gone on with his design, and followed it deeper, he tells me had no reason to doubt, but he might still have traced it much farther into the earth. This is observable, that commonly the joints as well of the inland pillars, as those of the causway, as they have their situation nigher the earth, are longer and taller than those towards the top of the column, but no difference is observ'd in the cavities or risings of the joints, as they are placed higher or lower in the same pillar, they continue much the same as to their depth or protuberance from top to bottom: yet the utmost top of such of the pillars that feem compleat and entire, always terminates with a joint that's flat on the upper fide, and no way either concave or convex like all the rest below it.

By what means these stony joints, so ponderous and bulky, and so distinct and discontinued bodies from one another, should arrive at first to this great height, and reach the summits of these tall columns where they now are placed, seems a problem of that difficulty, that some perhaps for its solution may be apt to think they were co-eval with the first creation, and ranged then in the same order they now stand by the great Fiat that produced the world. But it were easy to give another conjecture of this odd appearance, were I not better pleased to observe and set down the history of nature as it truly is, than to amuse my self and others by making vain and uncertain guesses at the hidden causes of its Phæno-

mena.

As to the internal substance of this stone, 'tis of an extraordinary hard, close and compact texture: its greet or grain so very even and sine, that it hardly appears unless view'd near the eye, and when the stone is newly broke; then it shews its self on its surface like a very minute small glisning sand thickly interspersed with the rest of the solid; which by reason its parts are so simply combined together, has something more of gravity in proportion to its bulk, than most other sorts of stone, unless such as partake of the Marchaste or Pyrites, and are more ponderous than usual from a metalline principle being an ingredient in their composition; of which this does not at all participate or at least not in any considerable quantity that I can discover.

It feems as if it were one plain homogeneous body, without any mixture of Cochlite, Belemnite, veins of Spar, or such like extraneous matter, so commonly met with in most other stony concretes: nor can there be observed rays, sur-

roughs,

roughs, striæ, or any manner of lines running along its superficies; so that it is capable of a good polish, and I find has in perfection that quality of the Lapis Lydius, Basanus or Touchstone, so much celebrated of old, for shewing the various impressions different mettals make upon it when rub'd or drawn along its surface; but being a stone naturally divided into small pieces or joints, and of so hard a body, that it turns or breaks the edges of the best tools, when they offer to cut it; it seems unfit for the imbellishing of houses, and all the other greater uses of architecture and statuary.

Its ruff and natural out-side that's expos'd to the open air, and beating of the weather, is of a whitish colour, much the same with that we see on common rocks and lime stone; but the inside, when you sever one piece fresh from another, is of a blackish iron-grey, like that of the best black marble before 'tis

polished, but somewhat of a darker shade.

And indeed I can discover but little, if any, difference between the substance of this stone, and that of marble: 'Tis true, the most common fort of marble is not near so hard and close a body; yet that does not import much, since 'tis known that several kinds of marble vary extreamly from one another in these respects; for which we may take Pliny's word, Histor. Natural. lib. 36. cap. 7. Marmorum genera & colores non facile est enumerare, cum sint in tantâ multitudine: and a little farther in the same Chapter, speaking more particularly of the various kinds of marble, he mentions one fort of it found in Æthiopia, Quem vocant

Basalten ferrei coloris atque duritiæ unde & nomen.

And truly the stone of our Giant's Causway agreeing so well in hardness, colour and substance with this Æthiopick marble described by Pliny, and Kentmanus, reducing a fort of pillar'd stone in Misnia, near Dresden in Germany, that nearly resembles ours in many of its properties, to the Basalites: I thought I could not more aptly refer it to any species of sossil yet known, than to that, and therefore gave it the name of Lapis Basaltes, vel Basanus Hibernicus, but not being so well informed then, I ran into a mistake, when I said, Angulis minimum quinque plurimum septem constants; whereas I should have said, Angulis minimum tribus plurimum osto constants; and this shews it to partake still more of the nature of the Misnian Basaltes, tho' it comprehends two sorts of pillars which that

has not, those of three and those of eight sides.

This puts me in mind of taking notice to you, that I cannot but think that gentleman extreamly out, whoever he is, for he conceals his name, and perhaps would have done well had he his opinion too, that published a paper Numb. 23. p. 46. in the monthly miscellaneous letters, where he says, The stone of the Giant's causway, (which I am confident he had never seen) might rather be referr'd to the Entrochi than to the Lapis Basaltes or Basanus. Now the Entrochi, you know, are cylindrical bodies, and never angular, always of a small size, the largest not above an inch diameter, and their solid quite of another substance, a soft brittly matter, much of the same grain and texture with the lapis judaicus: which are such signal and essential characters to distinguish it from the stone of the causway, that nothing would be more absurd in natural history, than to reduce two minerals so vastly different, to one and the same tribe; whereas I find

no disagreement that's considerable, between the columns of the Basaltes Misenus and those of the Basaltes Hibernicus, but that the former are made of one entire stone, which in the latter is divided into joints; and this I take as grounds

only sufficient to constitute a bare specifick difference, and no more.

Georgius Agricola, in his book de Natura Fossilium, lib. 7. p. 327. has a passage (and which I find confirmed too, by a later author living in that country, Lachmand de Fossilibus, &cc.) wherein he mentions a fort of marble found in the district of Hildespeim in Germany, that seems to bear in several respects, a great analogy or agreement with this stone of the Giant's Causway, because they are but short, I'll give you his own words; In Hildespeimo quoque e regione arcis Mariebargi collis est plenus lapideis trabibus, quarum capita interdum eminent, sunt vero perlonge acervatim posite inque medio earum terra est colore nigro, ferro aut altero lapide percusse non aliter ac marmor Hildespeimum cornu usti virus olent omninoque exeadem materià sunt. He does not indeed tell us the precise figure of these marble beams, yet it seems probable at least that some were square, which makes him call them, Trabes lapideæ. But however that might be, this I'm assured of from frequent experiments, that the Marble of the Giant's Causway, like these stony beams, when forcibly struck with another stone, or a bar of iron, sends forth a strong offensive scent like burnt horn.

But I shall forbear making any more of these kind of remarks, or raising deductions from them, considering that I write to one whose accurate observations, vast reading, and ample experience in Fossils, can, if he please, surnish me with those that are so much more instructive and judicious than my own: and shall therefore add no more, but intreat you to let me know your particular sense of this wonderful product of nature, and your impartial censure of what I have said concerning it; and then I shall quite accomplish all that I proposed to my self by troubling you with this, the acquiring knowledge, and shewing you that

I am,

Dublin, March 25. 1698. YOUR's, &c.

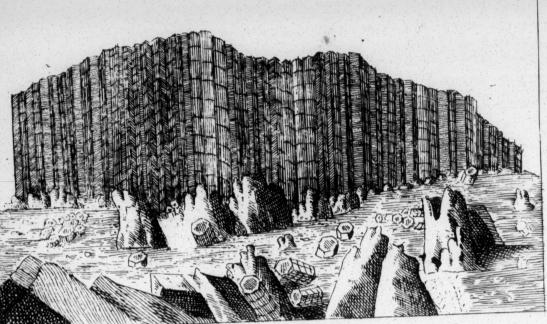
Of the Vertues of Mackenboy, by Dr. Ashe, Lord Bishop of Cloyne.

DR. Mullen tried lately an experiment upon the famous Irish herb, called Mackenboy, or Tithimalus Hibernicus, which is by the natives reported to be so strong a purge, that even the carrying it about one in their cloaths is sufficient to produce the effect; this fabulous story which has long prevail'd, he prov'd false, by carrying its roots for three days in his pocket, without any alteration of that fort.



The East of the Camfroay.

A Scale of Feet .



Part of Swilland

Explanation

- The great Campray which is from B to C 135 yards from D to E 120 yards from E to G 64 yards
- The imperfect Carofinay which is 120 yards long
- Stones the same of the Carofway which bye on their sides in the hill.
- K Rock wig Sea which appear to be the same cort of stone
- I The Organs which are Pellars y same with y Carofway
- M The Chimneys which are Stone and make that Figure

Note there are several of these kind of Stones seen in · the sides of the Rocks.

The prickt line in the Canfroay shares how far the Sea flow at high water.

A true PROSPECT of th GIANTS CAWSW PENGORE HEAD

in the County of Antrim . About Six Meles to the North West of Taken from the North West By Edwin at y Expence of the

The Rt. Hono ble St. Cyrill Wich I The Rt. Revord Dr. Alhe Bishop of William Molyneux Efq. 1 icc Profider



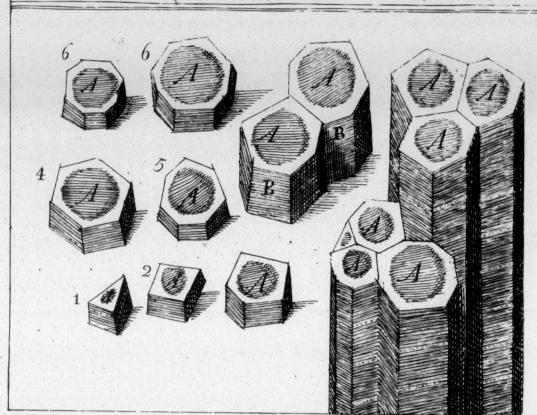
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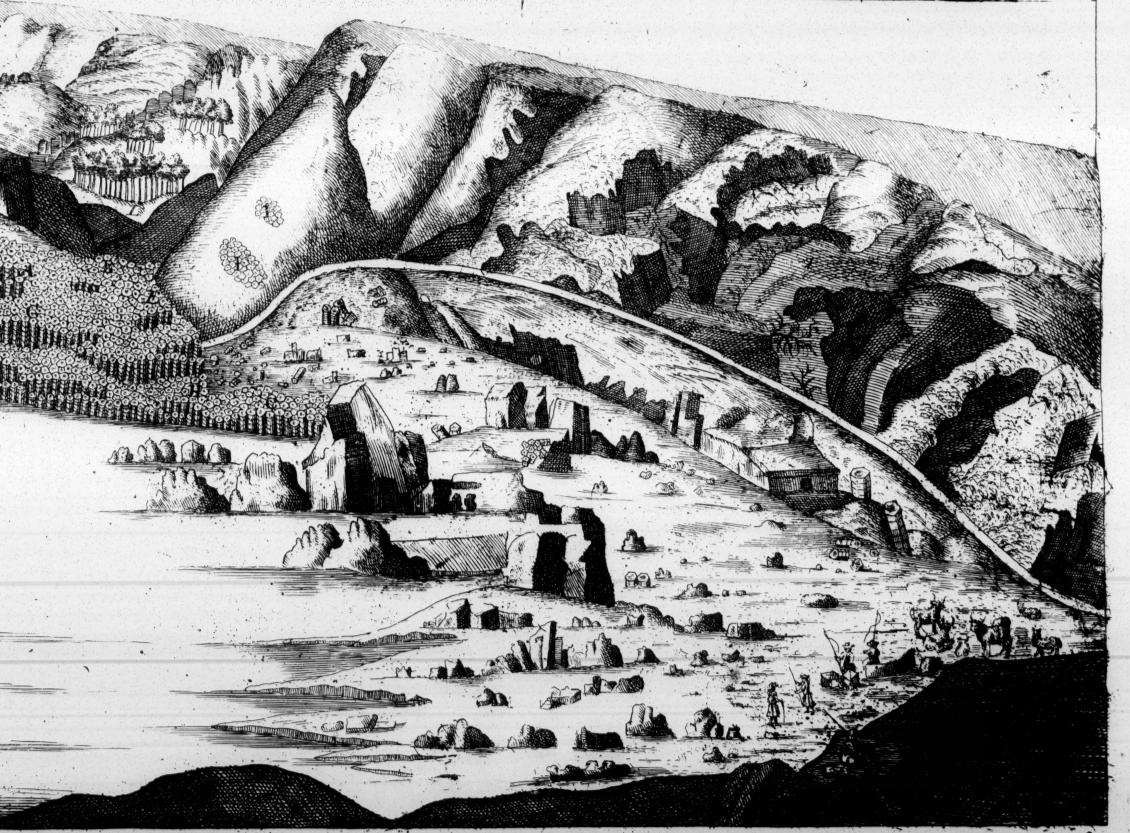
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trim
b West of Colerain
Edwin Sandys 1696.

Wich K^t Prefident hop of Cloyne & Prefidents.

These Figures represent all the Varieties of joynts that make up & feverall sorts of Collumns some of them apart others joyning together. La joynt of 3 sides 2 a joynt of 4 sides 3 a joynt of 5 sides 4 of 6 sides 5 of 7 sides 66 a larger & smaller joynt of 8 sides AA.1A Round Cavities or convexity, by which each joynt adapts its self to the next immediate joynt above or be low it BBB Columns of several sorts expressed larger seyned together the belter to shew & way how & several figured Pillars stand together in & Causway





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An Account of the Manner of manuring Lands by Sea-shells, as pra-Etised in the Counties of Londonderry and Donnegal in Ireland. By His Grace the Lord Archbishop of Dublin. Communicated by Samuel Molyneux Esq;

BOTH these counties are very mountainous, and those mountains covered with boggs and heath, in so much that there is little arable ground in them, except what has lately been made so. There are three ways practis'd to reduce heath and bog to arable land: the first is by cutting of the scurf of the ground, making up the turf so cut in heaps, and when the sun has dryed these heaps, they are then set on fire; when burnt as much as they can be, then those heaps are scattered on the ground, and it being plowed, it beareth barley, rye or oats, for about three years.

The inconveniences are first, that such burning desiles the air, causeth rain and wind, is not practical in a wet summer; and by destroying the sap of the earth and roots of the grass, and all other vegetables, renders it useless for seve-

ral years after the third, in which it is plowed.

The second way is by liming; this is much better than the former, because it doth not so much depauperate the ground, will last long, and beareth better grain, and whatever is pretended, doth not destroy the grass, if due care be taken not to overplow it; but then this is very dear, and lime-stone is not every where to be had, and in many places fire is wanting.

Dung is the common manure in all places, and therefore I shall say nothing

of it.

Marl is not used, that I have observed, in the north, but about the sea-side the great manure is shells: any one that will look into the map, will see how the bay of London, commonly call'd Loughfoyle, lies; towards the eastern part of it, there lie several eminencies that hardly appear at low water; these are made of shells of sea-fish of all forts, more particularly of perriwinkle, cockles, limpet, &c. The country men come with boats at low water, and carry loads of these shells away; they leave them in heaps on the shore, and there let them lie till they drain and dry, and by that means become much lighter for carriage; they carry them by boats as far as the rivers will allow them, and then in facks on horses perhaps six or seven miles into the country; they allow sometimes 40 but mostly 80 barrels to an acre; they agree with boggy, heathy, clayey, wet or stiff land, but not with fundy. They seem to give the land a fort of terment, as barm doth to bread, opening and loofening the clods, and by that means making way for the roots to penetrate, and the moisture to enter into the fibres of the roots: the manure continues so long, that I could find none that could determine the time of its enduring.

The reason of its long continuance seems to be this, that the shells melt every year a little till they be all spent, which requires a considerable time, whereas lime, &c. operates all in a manure at once; but 'tis to be observed, that in six or

feven years the ground grows so mellow, that corn that grows on it becomes rank, and runs out in straw to such a length, that it can't support it self, and then the land must be suffered to lie a year or two, that the ferment may be a little quieted, and the clods harden, and then it will bear as long again, and, for ought I know and could find it, continues to do so with the like intermissions for 20 or 30 years.

In the years in which the land is not plowed, it bears a fine grass mixed with dasses in abundance; and it is pleasant to see a steep high mountain, that a few years before was all black with heath, on a sudden look white with dasses and

flowers.

It fines the grass, but makes it short tho' thick: observing that this manure produced flowers in the field, I made my gardiner use these shells in my flower garden, and never faw better carnations, or flowers fairer or larger than in that cold climate; and it contributes to destroy weeds, at least doth not produce them fo much as dung; it likewife produces very good potatoes at about a foot distance from one another; and this is one method of reducing boggy barren land. They lay a little dung or straw on the land, and sprinkle it with shells; sometimes they cut the potatoes if large, that they may go the farther, and then dig trenches about fix or feven foot distance, and throw the earth or foil they take out of them on the potatoes, so as to cover them, and then fencing the plot of ground so planted, let them grow. Plant them in April or May, and they are ripe in August; they dig them as they have occasion, and let them lie till next year, then dig them again, and so the third year, every year they by this means go deeper in the earth, and the last they dig them, then pick them out as carefully as they can, that little feed may remain; and the fourth year they plow the ground and fow barley, and the produce is very good for some years; some potatoes will remain and grow up without any hurt to the barley or oats, and those they dig and pick out, and the ground remains good and arable ever after.

"Tis observable, that shells do best in boggy ground, where the surface is turf; turf generally is nothing but the product of vegetables, such as grass, heath, &c. that being rotten the salt is washed away by the water, and there remains only the earthy, and especially the sulphureous parts of them, as appears from the inflammability of turf; now shells being chiefly a salt, it incorporates with the sulphur of the plants, and renders them sit for the vegetation of new plants.

And this appears further from this, that shells, that have been under the salt water, are much better than such as have been in the earth, or dry at the strands: almost about the bay of Londonderry, if you dig a foot or two it yields shells, and whole banks are made up of them; but these, tho' more entire than such as are brought out of the shell-island, are not so profitable for manure.

I observed in a place near Newtown Lamavady, about two miles from the sea, a bed of shells, such as lie on the strand; the place was cover'd with a scurf of wet spouty earth about a foot thick; the country people used the shells, but they were not reckon'd so good as those that are sound in the sea or near it.

The land about the sea-side bears very indifferent wheat, nor will the shells in that particular, without some dung; but I very much doubt whether that be not due to the ignorance of the sarmers that generally understand nothing of wheat.

Some thousands of acres have been improved by the shells, and that which formerly was not worth a groat per acre, is now worth four shillings: they have in many places thus improved the very mountains that before were very turf bogs. In these they meet with this inconveniency, that if the season for plowing proves wet, their hories sink so deep in the soil, that they can't plow it, especially after two or three years.

They commonly made lime of the shells formerly, and some do so still. I have not, that I remember, seen any such lime, but I understood that it bound very well, and I believe it is not so corrosive as lime made of stone; for I find in the history of Ceylon, that they may make up their land with lime of oystershells, and which, I believe, would be impracticable with common lime.

About thirty years ago they made lime of the shells, and manured their lands with it; but a poor countryman, that out of laziness or poverty had not provided to make lime, threw the shells unburnt on his land; his crop proved as good as his neighbours, and the second and third crop better, and all took the hint, and have used them so ever since.

Where shells are not to be procured, sea rack or fand supply the want of them, but are not so good; sea rack lasts but three years, and fand little longer.

'Tis certain Ireland has been better inhabited than it is at present: mountains, that now are covered with boggs, have formerly been plowed; for when you dig five or fix foot deep, you discover a proper soil tor vegetables, and find it plowed into ridges and furrows: this is observable in the wild mountains between Ardmagh and Dundalk, where the redoubt is built, and likewise on the mountains of Altmore: the same, as I am informed, has been observed in the counties of Londonderry and Donnegall; a plow was found in a very deep bogg in the latter, and a hedge with wattles standing, under a bogg that was five or fix foot deep above it. I have seen the stump of a large tree in a bogg ten toot deep at Castle-Forbes; the trunk had been burnt, and some of the cynders and ashes lay still on the stump. I have seen likewise large old oaks grow on land, that had the remains of ridges and furrows. And I am told, that on the top of an high mountain in the north, there are yet remaining the streets and footsteps of a large town; and in truth, there are few places, but either visibly, or when the bogg is removed, there remains marks of the plow; which fure must prove, that the country was well inhabited. 'Tis likely that the Danes first, and then the English destroyed the people; and the old woods seem to those that pretend to judge, to be about three or four hundred years standing, which was near the time that Courcey and the English subdued the north of Ireland, and 'tis likely made havock of the people that remained after the Danes were beat out of Ireland.

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A Letter from Dr. Thomas Molyneux, Fellow of the Royal Society, to the Right Reverend St. George, Lord Bishop of Clogher; concerning Swarms of Insects, that of late Years have much infested some Parts of the Province of Connaught in Ireland.

My Good Lord,

E VER fince your lordship first spoke to me of the strange appearance of vast swarms of a fort of insects in this kingdom, that have lately much insected some parts of the province of Connaught, and the great ravage and devastation they have wrought in that country: I endeavour'd to inform my self the best I could concerning them; partly, I confess, from an inclination common to those of my profession, to make inquiries into things natural; but more especially from an earnest regard to gratify your lordship's expectations and desires, which I have always look'd upon as commands, in whatever lies in my power.

And truly, had not this latter motive wholly prevailed upon me, I should have desisted, and given over the further prosecution of this search; for I sound I undertook it with such disadvantages, that I could not possibly perform any thing in it, but what must be very lame and impersect; and so could never satisfy or please my self with it, otherwise than that it was a testimony of my re-

spects to your lordship.

For this flying army, as I may call them, making their first incursion, and taking up their quarters, in a place so remote, above a hundred miles from hence, where I never have been; all the account I can give your lordship of them, their marches, and the destruction they have brought on the country; is only what I have gathered by sending out for intelligence, and depending on the reports of others; for what I am able to say of my own knowledge is but little, and what I observed of this fort of sly in another country, and not in this.

Therefore you must not expect their history, or an exact narrative, but only such loose particulars, as I could pick up by discoursing some gentlemen that live in those parts where they swarm, little addicted, you may well suppose, to make or communicate observations of this kind: however, I shall not trouble your lordship with bare hearsays; the following account is what I took up upon sure grounds, and what was generally confirmed to me, by the relations of more than one; and I must here own my self especially obliged, for a great part of my information, to a letter your lordship did me the favour to procure, from one of your acquaintance on this subject.

The first time great numbers of these insects were taken notice of in this kingdom, I find was in the year 1688. They appear'd on the south-west coast of the county of Galloway, brought thither by a south-west wind, one of the common, I might almost say, trade-winds, of this country, it blows so much more from

this quarter in Ireland, than all the rest of the compass.

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From hence they made their way into the more inland parts towards Heddfords a place belonging to fir George St. George, bart. about twelve miles north from the town of Galloway; here and in the adjacent country, multitudes of them shew'd themselves among the trees and hedges in the day time, hanging by the boughs, thousands together in clusters, sticking to the back one of another, as is the manner of bees when they swarm. In this posture, or lying still and covert under the leaves of the trees, or clinging to the branches, they continued quiet with little or no motion during the heat of the sun, but towards evening or sunfet, they would all rise, disperse, and sly about, with a strange humming noise, much like the beating of drums at some distance, and in such vast incredible numbers, that they darkned the air for the space of two or three miles square.

Those that were travelling on the roads, or abroad in the fields, found it very uneasy to make their way through them, they would so beat and knock themselves against their faces in their flight, and with such a force, as to smart the

place where they hit, and leave a flight mark behind them.

This, tho' it was no little trouble, especially to children, and those that were more nice and timorous of the semale sex; yet it was not the only inconvenience they brought along with them; for a short while after their coming, they had so entirely eat up and destroy'd all the leaves of the trees for some miles round about, that the whole country, tho' it was in the middle of summer, was left as bare and naked as if it had been in the depth of winter, making a most unseemly and indeed frightful appearance; and the noise they made, whilst they were seizing and devouring this their prey, was as surprizing; for the grinding of the leaves in the mouths of this vast multitude all together, made a sound very much resembling the sawing of timber.

Nor were the trees abroad, and hedges in the field the only sufferers by this vermin, they came also into the gardens, and destroy'd the buds, blossoms, and leaves of all the fruit trees, that they were left perfectly naked; nay, many of them, that were more delicate and tenderer than the rest, lost their sap as well as leaves, and quite withered away, so as they never recovered it again, particu-

larly feveral trees in the curious plantation of one Mr. Martin.

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Nay their multitudes spread so exceedingly, that they disturbed men even within their dwellings; for out of the gardens they got into the houses; where numbers of them crawling about, were very irksome, and they would often drop on the meat as it was dressing in the kitchin, and frequently fall from the ceiling of the rooms into the dishes as they stood on the table while they eat, so extreamly offensive and loathsome were they, as well as prejudicial and destructive.

Nor did the mischievous effects of this pernicious vermin stop here, their numerous creeping spawn, which they had lodg'd under ground next the upper sod of the earth, did more harm in that close retirement, than all the flying swarms of their parents had done abroad: for this young destructive broad, did not with-hold from what was much more necessary to have been spar'd, and what their sires had left untouch'd: these lying under ground, fell a devouring the roots of the corn and grass, and eating them up, ruined both the support of man

and

and beaft; for these losing their roots, soon withered and came to nought, to

the vast damage of the country.

This spawn, when first it gave sign of life, appeared like a large maggot, and by taking food and increasing every day, became a bigger worm, till at length it grew as big as a great white caterpillar; from whence, according to the usual transformation natural to these smaller animals, came forth this our slying infect; but how or at what certain periods of time, these metamorphoses and chan-

ges were wrought, I could not meet with any one able to inform me.

This I thought remarkable, that these young and tender worms should live on a courser diet, and fare more hardly than their strong and older parents, whose food was the fine soft substance of leaves and blossoms, whilst these fed upon the tough and almost ligneous fibres of the roots of plants. But I find Dr. Lister has observed the like difference between the diet of common caterpillars and their butterslies; those eating the grosser food of leaves, whilst these live only on the pure refined meal, and most spirituous juice of flowers: and this seems one of the wise contrivances of nature, that adapts as most proper the airy finer nourishment, for the more agile and light body of the volatile insect, while the same animal, when a dull reptile worm, is sustained by a more gross and terrene food, more fitting to its slow and heavy nature.

But notwithstanding this plague of vermin did thus mightily prevail and infest the country, yet it would have been still much more violent, had not its rage

been fortunately checkt feveral ways.

High winds, wet and misling weather, were extreamly disagreeable to the nature of this insect; and so prejudicial as to destroy many millions of them in one days time: whence I gather, that tho' we have them in these northern moist climates, they are more natural and more peculiarly belonging to warm and dry countries. Whenever these ill constitutions of the air prevailed, their bodies were so enseebled, they would let go their holds, and drop to the ground from the branches where they stuck, and so little a fall as this, at that time, was of sufficient force quite to disable, and sometimes perfectly kill them. Nay, it was observable, that even when they were most agile and vigorous, a slight blow or offence would for some time hinder their motion, if not deprive them of life, which was very extraordinary in a creature of that strength and vivacity in its slight.

During these unfavourable seasons of weather, the swine and poultry of the country at length grew so cunning, as to watch under the trees for their falling; and when they came to the ground eat them up in abundance, being much pleased with the food, and thriving well upon the diet: nay, I have been assured, that the poorer fort of the native Irish (the country then labouring under a scarcity of provision) had a way of dressing them, and lived upon them as food; nor is it strange that what sattened our domestick poultry and hogs, should afford

agreeable and fufficient nourishment for the relief of man.

In a little time it was found, that smoak was another thing that was very oftensive to these slies, and by burning heath, fern, and such like weeds, in this or that corner of their gardens or orchards, which lay most convenient for the wind to disperse it among the trees, they would secure their gardens and prevent

their

their incursions, or if they had already made any incroachment upon them, by this means they effectually drove them out again.

But towards the latter end of the summer, the exact time I have not learnt, they constantly eased the country, and retir'd of themselves; and so wholly disappear'd, that in a few days you should not see one left in all those parts that

were so lately pester'd with them.

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Where they go is made a question, some thinking they take their flight like swallows, and other birds of passage, as they are call'd, to a more distant country and warmer climate. But I believe there is no other ground for this fancy, than 'tis observed of this insect, that sometimes it is migratory, and removes its quarters from one kingdom to another; but this I conceive is but accidental; and that it commonly quits its former seat, only for want of provision, or as we see bees do, when they find their hive, or whatever place they fix upon for their habitation, becomes over-stockt and too narrow a compass for their reception as for their removing to so great a distance, as to change one country for another, it happens only I suppose, when some high wind suddenly rises at the time of their swarming, and drives them even cross the seas to feek for a new dwelling in some other land.

The true reason then of their disappearing I take to be, that after their coition is over, for 'tis about this time they are seen to couple by fastning to one another by their tails, they retire under ground in order to lay their spawn there, for a succeeding generation; and likewise to compose and settle themselves to sleep for the rest of the ensuing year, as several other animals are known to do: for instance, snails among insects, the hedghog among the beasts, and as I have good reason to think, the Ortygometra or rail among the birds; a fort of sowl, that's scarce, if at all met with in some parts of England, yet very numerous in all parts of this country in its season, but that's but short, and lasts not above three or four months in the summer, during all the remaining parts of the year,

it lies buried and afleep under ground like thete flies.

What further confirms me in this opinion concerning these insects, is, that I am certainly inform'd by several good hands, that in the spring time, by accidental digging or plowing up the ground, great hollows or nests of them are frequently discovered and broken up, where they find whole bushels together in one heap, but in such a quiet condition they seem to have but little life and motion, for they do not stir unless you touch or disturb them, and then move but little and feebly, as if they had been asseep and were wakened out of it.

Whether they find out these large caverns to which they retire, ready made in the earth, or hollow and form them first for their own reception, I cannot say, but this I am assured, that they are often met with under a firm solid surface of earth, that has not been stirred or plowed in many years before, and no

manifest passage can be discovered how they got there.

I am informed of another particular relating to them, and which indeed was very remarkable; that a year or two ago in the summer, all along the southwest coast of the county of Galloway, for some miles together, there were found dead on the shoar, such infinite multitudes of this vermin, and in such yast heaps, that

by a moderate estimate, one computed there could not be less than forty or sifty horse loads in all; which plainly discovers to me, how and from whence the first stock of these came to us, in 1688. For, as I take it, this exceeding great quantity that lay dead in the strand, was a new colony or a supernumerary swarm from the same place, driven by the wind to sea from their native land, which I conclude to be Normandy or Brittany in France, it being a country much insested with this insect, and that lies very open and exposed to all these parts of Ireland; and from whence * England heretofore has been petter'd in the same manner with swarms of this vermin. But these meeting, by good fortune, with a contrary wind before they could reach land, their progress was stopt, and tir'd with their voyage, they were all driven into the sea, which by the motion of its waves and tide, cast their floating bodies in heaps upon the shore.

This was a most lucky accident, for had this second supply met with as savourable a gale, and the like reception with their predecessors, 'twould have been of vast ill consequence to us; for how exceedingly must they have increased the numbers of these we have here already, which alone are sufficient yearly to trouble

and damnify the country to a great degree.

Yet some years are observ'd not to be near so much infested with them, as others, either on the account, as I imagine, of the season proving more prejudicial to them and their spawn; or that they removing their quarters, leave one part of the country more free, to settle in another; for they seldom keep above a year together in a place, and they compute their usual stages or march to be about six miles in a year. Hitherto they have directed their progress from the place where they first made their invasion, westerly, tollowing the course of that wind which blows most commonly in this country.

This last year, 1697, they have reached as far as the Shannon, and some of the scattered loose parties crost the river, and got into the province of Leinster, but were met there by a stronger army of jackdaws, that did much execution among them, killing and devouring great numbers. Their main body still keeps in Connaught, and took up their last quarters at a well improved English plantation, not far from the river Shannon, call'd Air's court, where they found plenty of provision, and did a great deal of mischief by stripping the hedges, gardens, and groves

of beech quite naked of all their leaves.

They begin to be apprehensive of them in the Queen's-county; and in order to defend themselves against their incursions, are resolved upon their first approach, to fire the mountains between them and the King's-county, that abound much with heath, and by this means raising a smoke, they hope they may force

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Of which the learned Moufett in his book de infectis has left us a remarkable history, p. 160. where speaking of this same sly, he says; Proditum est in Anglorum annalibus, anno Christi 1574 vicessimo quarto tebruarii, tantam eorum multitudinem in Sabrinam sluvium delapsam, ut aquaticis molendinis rotas sisterent atque obruerent; et sane nisse una cum hominum industria, gallinæ, anates, caprimulgæ, tinnunculi, vespertiliones, alieuque prædatrices aves, (quæ hos in primariis habere cibis videntur) auxilio suissent, sufficatæ ab iis molendinæ, etiam num hodie obmutuissent.

them to turn their course another way, and so prevent their making an inrode

into these parts.

Wherever the country has been infested with this vermin, by one consent, though erroneously, they have given them the name of locusts, being led into this persuasion, I suppose, by thinking that nothing of this kind could have been so numerous, and done so much mischief, but locusts only; of which, and the great destruction wrought by them, they have heard mention so often made in the scriptures.

But the true locust, much resembling in shape a common grashopper, though larger, is quite a different sort of insect from this, which belongs to that tribe call'd by the naturalists Korest steeps, or Vaginipennis, the Scarabeus or beetle kind, that has strong thick cases to defend and cover their tender thin wings, that he

out of fight and next the body.

This species is certainly that particular beetle, call'd by Aristotle in his history of animals Mexically, from its devouring the blossoms of apple trees, see Aldrovandus de insectis, lib. 4. pag. 448. and is the Scarabeus arboreus of Mouset and Charleton, call'd by the English, dorrs, or hedge-chasters, and by the French, les Hannetons.

They are much of the bigness of the common black beetle, but of a brownish colour, something near that of cinnamon, they are thickly bespersed with a fine short downy hair, that shews as if they were powder'd all over with a fine sort of dust: the cases of their wings do not entirely cover all the back, for their long peicked tails, where lie the organs for generation) reach a good way beyond them; the indentures or joints of each side their belly, appear much whiter than the rest: but to avoid being so particular in describing all their parts, I have hereto annex'd a true and exact figure of one of them, borrowed from the Scarabeorum tabulæ mutæ of Dr. Lister, who has neatly exprest it.

And this will give your lordship at one view, a fuller and truer idea of them,

than the longest and most accurate verbal description possibly could.

Here some pleasant scoffing men in the world perhaps might be apt to say, what an extravagant folly this is, to make so many words, and keep all this ado, about a poor contemptible sly. But if these gentlemen will consider the exceeding great damage, that sometimes befals mankind, as a natural attendant on this infignificant animal as they would have it, their idle ridiculing humour might with as much shew of reason, droll upon and expose a serious discourse of the

plague. To proceed then:

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This pernicious infect of ours, I am fully convinced, my lord, from good reasons, is, that self same (so often mention'd in holy scripture, and commonly joined in company with the locust, as being both great destroyers of the fruits of the earth) to which the Septuagint, and the vulgar Latin translation, retaining the Greek word, give the name of Briggs or Bruchus, derived from Bgigg, frendo vel strideo, intimating the remarkable noise it makes both in its eating and slying, from whence likewise it has got its French name Hanneton, (as the judicious Furetiere in his copious French dictionary tells us) by corruption from aliton, quasi alis tonans.

I meet with this fort of fly spoken of in the bible, Leviticus chap. xi. ver. 25 and Nahum, chap. 3. ver. 16, 17. and it may occur, for ought I know, in several other places; but I find our English version almost constantly translates this word Best xos, though improperly, as I think, cancer-worm, since this denotes only a reptile, or creeping vermin, whereas that word imports certainly a flying insect. For the Best in chap. 3. ver. 16, 17. of the prophet Nahum is expressly said to fly, and have wings, and its nature and properties are most truly and particularly described in these words: It spoileth and flieth away, they camp in the bedges in the day, and when the sun ariseth they slee away, and their place is not known where they are: that is, they then retire again to the hedges and trees where they lie quiet and concealed, till the sun sets again.

If this passage be compared with what I have said above of our Irish Brown, we must allow Nahum plaid the natural philosopher here, in this short, but accurate description, as well as the divine prophet, in denouncing God's judgments.

In one of the forementioned texts I find indeed, the word BPBZES more rightly translated locust or beetle in our English bibles, and this place on another account seems so apposite and agreeable to something I said before, I cannot avoid taking particular notice of it to your lordship, and on this occasion give you my thoughts more fully concerning the Rationale of that odd clause in the Jewish law, where Moses tells the Israelites, Leviticus chap. 11. ver. 21, 22. That these may ye eat, of every slying creeping thing that goeth upon all four, which have legs above their feet to leap withal upon the earth, even these of them ye may eat; the locust after his kind, and the bald locust after his kind, and the beetle after his kind, and the grashopper after his kind.

Now I must confess, not withstanding all that the learned commentators have said on this passage, it hitherto has seemed to me, (and I believe to most readers) very strange and unaccountable, that here among the pure, who some creatures, proper for human nourishment, beetles, and those other nasty, dry, and unpromising vermin should be thought sit to be reckoned up, as clean and proper for

the food of man.

But fince I have had some little experience of what has happen'd among our selves, upon swarms of one of these fort of insects insesting but a small part of our country, I cannot but admire the providence of God, and the sagacious prudence of his divine law-giver, Moses, who foreseeing the great dearth and scarcity that these vermin might one day bring upon his people, had a particular regard to it, and therefore gives them here a permissive precept, or a fort of hint what they should do, when the corn, grass, olive-trees, fruit-trees, vines, and other provisions were destroy'd by the locust and Bosecot, or beetles swarming in the land: why then for want of other nourishment, and rather than starve, he tells them, they might eat, and live upon the filthy destroyers themselves, and yet be clean: for no one can reasonably imagine, they would ever condescend to make use of such vile dirty food, if they could at the same time get any other. So we are to understand that passage of the new Testament, in St. Matth. chap. 3. ver. 4. and Mark chap. 1. ver. 6. where 'tis recorded of St. John Baptist, that he lived

upon locusts and wild honey, that he did this only in the desert wilderness, where no other sustenance was to be had.

And thus we see the native Irish were (though unknown to themselves) authors of a practical commentary on this part of the Levitical law, and by matter of sact have explained what was the true sense and meaning of this otherwise so dark and abstruct text; and indeed such a caution as this was highly necessary, and of so great moment to the Jews, that it was well worth the care and wisdom of their great leader and prophet, to insert a particular clause in their law concerning it: for 'tis certain Palestine, Arabia, Egypt, and the other neighbouring countries about them, were all extremely subject to be insested with these forts of pernicious vermin; which is the reason they are so frequently mention'd, and sometimes threatned as judgments to the Jews, by the prophets in their sacred writings.

And this also puts in my thoughts, that it is more than probable, this same destructive beetle we are speaking of, was that very kind of Scarabeus, the idolatrous Egyptians of old had in such high veneration, as to pay divine worship to it, and so frequently grave its image upon their Agulios and Obelisks, as we see at this day: though the learned and refining antiquaries, I know, give a far other account of this matter, and tell us a story of the beetle being a hierogliphical representation of the sun, and therefore held as sacred among them; yet this is made out but very lamely; and in my opinion, is a strange and forced conjec-

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Whereas nothing can be supposed more natural, than to imagine a nation addicted to polytheism, as the Egyptians were, in a country frequently suffering great michief and scarcity from swarms of devouring infects, should from a strong sense and fear of evil to come, (the common principle of superstition and idolatry) give sacred worship to the visible authors of these their sufferings, in hopes

to render them more propitious for the future.

Thus 'tis allow'd of all hands that the same people ador'd as gods, the ravenous crocodiles of their river Nile; and thus the Romans, though more polite and civilized in their idolatry, Febrem ad minus nocendum venerabantur, eamque variis templis extructis colebant; says Valerius Maximus lib. 2. cap. 5. nor were the barbarous Irish, though christian, backward to entertain several superstitious fancies of this vermin we are discoursing of, some imagining they were the souls of their deceased friends, killed in the battle of Aghrim, come in this manner by way of transmigration, to insest their enemies, the heretick English, because they saw they were the most disturb'd, and suffer'd the greatest losses by them: but this was only because their places of abode were most improv'd, and so afforded them best reception, and greatest plenty of provision for their entertainment.

Whether these physico-theological notions may be agreeable to your lordship's sentiments, I don't know; and therefore I lay them with all deference before your great stock of learning and most discerning judgment, as a certain test to discover to me, whether there is any thing in them or no: and if I am so happy as to find they are approved by you, though they are out of the common road; or should they run counter to what others have said, I shall not fear censure, or

believe my self at all the less in the right; for I am safe and pleased while I think as you think, and 'tis my greatest ambition to be

Your LORDSHIP's

Dublin, Oct. 5. 1697.

Most humble Follower, and

dutiful Servant in every thing.

Thomas Molyneux.

POSTSCRIPT.

My Lord,

IT unluckily so fell out, that I could not get the perusal of the industrious Bo-chart's learned work De animalibus sacræ scripturæ, (though I earnestly desired it) till I had made an end of this letter: but since I have procured it; and looking over what he says of this subject, I find though he differs from me in some things, yet he plainly confirms several passages in the foregoing paper, as I could shew by citations out of him; but the book being common, in every body's hands, I chuse rather to refer to it, than trouble your lordship with adding any thing more, but that I am again

Your most faithful

humble Servant,

T. M.

Account of a not yet described Scolopendra Marina, by Thom. Molyneux, M. D. S. R.S. Communicated by Mr. Locke.

Have lately met with a remarkable marine animal, which I take to be one of the many non-descripts, that the sea, by reason of its vast extent and profound depth, has hitherto reserved undiscovered, notwithstanding the diligent searches that have been made by laborious naturalists, after these kinds of productions.

This December, 1696. two of them were found in the stomach of the Asellus major vulgaris, or common cod-fish; a very voracious creature, as one may judge

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by its wide mouth, its large swallow and stomach. I have often found young crabs, lobsters, herrings, and such like small fish, some half-digested, others

perfectly entire in their stomachs.

The cod must have been taken somewhere on the sea-coast near Dublin, for 'twas tresh, and sold here in our fish-market; and I judge it had found this its prey not very far from the place where it self was catched; because one of the two sishes that were in its stomach, was compleat in all its parts, and had received no manner of alteration, save 'twas dead: the other, by lying longer in the stomach, was much mangled and broken: but though it was partly digested, yet one might plainly sec, 'twas another of the same fort of fish, which I am now going to describe.

It was bigger at one end, and went taper or gradually lessening towards the

other.

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It was four inches, and fix tenths of an inch long, and where largest, as it was an inch and fix tenths broad, so it was about three inches and a half in circumference; at the smaller end, not above four tenths of an inch broad.

It had neither shell, crust, scales, or bone for its covering, but was soft; yet not flabby or fleshy, as the waxaara or mollia, described by the naturalists but

rather membranous.

The back or upper fide was shaped roundish, especially towards the fides; in the middle 'twas something flatten'd, the belly was perfectly plain; along the middle of the back ran a large stripe from one extream to t'other, about eight tenths of an inch broad, towards the upper end, but still narrower, as it came towards the tail. This stripe was all covered with a short soft fort of down; not unlike in texture, colour and substance, to that which grows on the back of the leaf of tussilago or colts-soot.

Joining to the edge of this stripe, ran from one end to t'other, a list about two tenths of an inch broad, that covered both sides of the animal, and part of his back. This list or verge was thickly shag'd, with a fine soft hair that grew very thick, and about a quarter of an inch long, of a most delicate changeable red and green colour; and of so sparkling a vivid luttre, that nothing of

this kind could shew more beautiful.

Among this foft hair were thickly interspersed, without order, an abundance (some hundreds I believe) of black sharp hard prickles, about the same length of the hair, and the thickness of a hog's bristle, but much harder, and very sharp at the points.

The tail, or smaller end terminated in the back, with two triangular pellucid soft scales, that covered the orifice of the anus, at which its excrement was discharged, as I found when I open'd it; for the extremity of the intestine was

closely inserted into this passage.

The bigger end (tho' it had nothing of that peculiar shape that is common to the head in most creatures, and distinguishes it from the rest of the body; nor had any horns, eyes, ears, nose, or gills; yet because 'twas opposite to the tail, and here was the mouth) we may properly enough call it the head.

The mouth was a very large patulous opening, for the bulk of the animal; not placed at the end, but somewhat underneath, as part of the belly, and could

not be feen when the back was turned uppermost.

The belly was flat, and no ways protuberant, covered with a smooth naked skin, of a much lighter colour than the back, irregularly spotted, with little dark brownish spots, some larger, some smaller; 'twas broader towards the head, and grew narrower still towards the tail; where, for about the space of an inch, 'twas curiously pinched with little indentures, resembling the small joints in the tails of some infects; these divisions or joints were still shorter and closer to one

another, the nigher they were to the extremity of the tail.

Beginning close at each corner of the mouth, and so along both sides of the belly, was ranged a row of feet, in a close continued series down to the utmost tip of the tail; the largest were placed towards the mouth, and upper part of the body, where they were about a quarter of an inch long, but downwards they grew less and shorter, still gradually diminishing, the nearer they approached the end of the tail; where they were so minute, that they were insensibly lost, and not easily to be distinguished by the eye. I distinctly counted from the mouth to the tail, on one fide thirty fix, so that on both fides, the number of feet amounted in all to seventy two, and I could not be positive but there might be still more: Yet those feet which I plainly distinguished were a vast number for so short a reptile. From within the body, through the middle of each foot, past four, five or fix of the same fort of sharp hard prickles, that were interspers'd among the fost hair; these were larger or smaller, and more or less in number, according to the fize of the foot, and gave it strength and firmness instead of bones; and likewise, issuing forth beyond the end of the foot, ferved in lieu of toes or claws, for the defence of the creature, or to take hold by as it walked.

Joining to this row of feet towards the back, was ranged along each fide in a direct line, a feries of small, thin, soft, flat fins, face to face, in such an order, that each foot was exactly answered by its correspondent fin, so that their number was precisely the same with that of the feet, and they kept the same rule of proportion in their size, still gradually diminishing, the nearer they approached towards the tail. I distinctly counted of these as of the feet, thirty six of a side; each fin was curiously fringed at the edge, with the same beautifully coloured hair, I before mentioned to have covered the sides and part of the back. By help of these fins it performed progressive motion through the water as a fish, and by means of the seet could creep along the bottom of the sea, as a rep-

tile.

After I had well observed its outward shape, I opened it to see what I could discover within, but I found here little variety of parts; that which first offered, was a thin membranous gullet, that led from the mouth to the stomach, about an inch long: from this was continued streight downwards the stomach, not lying transverse, as is its most usual posture, but length-ways; 'twas of a whitish colour, and of a tough thick texture, consisting of an outward and inward membrane, with a fort of carneous substance between, resembling somewhat

what in make, tho' not in figure, the gizard in some sowl; 'twas as large as the upper joint of a man's little singer; to this was annext the intestine, of a very differing colour and substance from the stomach, for 'twas reddish, soft and tender, and of a much smaller cavity; 'twas continued almost directly, or with little circumvolution to the anus; and besides, these parts serving for nutrition, I could not distinguish any other viscera.

But that it had no brain, heart, gills, liver, or parts for generation, or something analogus to these I dare not assirm; yet this is certain, that nature has carefully supplied some impersect animals, such as the leech, a water reptile as this, with large and conspicuous organs for nutrition, whilst other principal

parts (if they have any) are hardly, if at all, to be distinguished.

But what was most remarkable in its inward structure, was the curious contrivance of the muscular parts, for the performance of its several motions; these were very apparent, by reason they were both large and distinct; one long continued stripe of red fleshy fibres, about the fixth part of an inch broad, randirectly along the middle of the back, from the head down to the tail: this fleshy stripe fent out from each fide, like so many rays, thirty fix several pair of smaller lateral muscles, which, by the considerable interstice between, I could easily distinguish from each other, making so regular a figure altogether, that they might very aptly be resembled to the spine, or back-bone of the passer marinus, or common plaif-fish, when it is entire with all its ribs or transverse processes, issuing by pairs from both fides of each Vertebra, from the head down to the tail; in this manner every particular foot and fin were supplied with their correspondent muscles, to give them motion, either together or apart, as the necessity or design of the animal required. And moreover, considering this fort of mulcular mechanism, with the taper shape of the body, and likewise the posture and use of the many prickles interspersed among the hairy shag that covered the sides; it feems very evident to me, that, besides its progressive motion, it had also the power (as have most of the many footed land-reptiles, and some water-insects I have observed) of contracting its body in such a way, that bending its head inwards, it roul'd the rest of the body round it as a center, making a figure like a rope coiled into a helix, and in this posture guarded it self from violences that might annoy it. For such was the shape of its body, that so roul'd up, it made a fort of globose figure, beset almost quite round with sharp prickles; fo we may often fee the large hairy catterpillers, that have not a little refemblance to this creature, when molested by any offensive object, strait secure themselves from the violence, by gathering up their body in this manner, and making their hairy briftles start out directly forward.

And this puts me in mind to reduce this animal to some certain tribe of creatures, already known and described; and I think on many accounts it cannot be more properly ranged than with the scolopendre marine, because it partakes of so many general properties in common with them, as its being a long hairy insect, with a vast number of seet, and an inhabitant of the sea; I know the scolopendre marine, as described by Rondoletius, and out of him by Gesner, Grevinius, Aldrovandus, and Johnstonus, are all more slender, and longer, and sharp

at both ends; but these are but specifick differences, and not so essential as to constitute a new genus. It will be easy therefore to distinguish in natural history those scolopendræ marinæ trom this, by calling it scolopendra marina a capite lationi versus caudam sensum gracilescens, Limbo pulcherrime hirsuto spinulisque crebris interstincto e mare Hibernico.

An Account of one Edmund Melloon, born at Port-Leicester in Ireland, who was of an extraordinary Size. Communicated by Dr. William Musgrave, Fellow of the College of Physicians, and R. S.

HE measures of some of the parts of an Irishman shewn at Oxford, was communicated to me by Dr. Plot: He was seven foot six inches high, his singer six inches three fourths long, the length of his span fourteen inches, of his cubit two foot two inches, of his arm three foot two inches and an half, from the shoulder to the crown of his head eleven and three fourths, his name Edmund Melloon, he was aged nineteen years, Anno 1684 and born at Port-Leicester in Meath, in Ireland.

Part of a Letter from Dr. Ashe, Lord Bishop of Cloyne, dated March the 26th, 1687. concerning the Effects of Imagination.

Linstance of the force of imagination upon the Fætus, 'twas a girl called Elizabeth Dooly, of about thirteen years of age, whose mother being with child of her, was frighted by a cow as she milked it, and hit with the teat on the lest temple within one eighth of an inch from her eye, in which very place the girl has a piece of slesh growing exactly like a cow's teat in bigness, shape, &c. except that it has a bone in the midst of it, which reaches above half the length; this piece of slesh is perforated, and she weeps through it, when she laughs it wrinkles up, it grows in proportion to the rest of her body, she is as sensible there as in any other part.

An Extract of the Journal of the Society at Dublin; giving an Account of a Periodical Evacuation of Blood at the End of one of the Fingers.

Decemb. 22. 1688.

A Letter was read from Mr. Ashe, in answer to a query sent down by the society to him, concerning a man who had a constant and periodical evacuation of blood at the end of his fore-singer; from which letter the following return is abstracted.

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Walter Walsh, an inn-keeper in Trym, born in Ireland, ot a temperate diet, sanguin complexion, and pleasant humor, in the 43d year of his age, Anno 1658. about Easter, was seiz'd with a great pain over all his right arm; a great heat, and redness in his right hand; and a pricking in the point of the fore-finger; whereon there appear'd a small speck, as if a little thorn had run in; and supposing it such he opened it, whereupon the blood spun out in a violent but small itream; after it had spent its violence, it would cease for a while and only drop, and then spring out with violence again, continuing thus for 24 hours, till at last he fainted away, and then the blood stancht of it self, and his pains left him : from that time during his whole life, (which continued 12 years) he was frequently troubled with like fits; seldom having a respite of 2 months, and they never returned oftener than in 3 weeks: he rarely bled less than a pottle at a time; the oftener the fit came the less he bled; and the more rarely it affaulted him, he bled the more; whenever they endeavour'd to stanch the blood, it raifed most exquisite tortures in his arm; no remedies that were ever used proved in the least effectual: he had no other distemper that troubled him; neither feafon, nor weather wrought upon him: he had no outward accident that at first brought the bleeding: drinking more than ordinary made him more apt to bleed: he had no child after his first seizure: these frequent fits brought him at last very low, infomuch that towards his latter end he bled but little, and that too but like diluted water. He died of this distemper on the 13th of February, 1669-70.

A Discourse on the Dissection of a monstrous double Catt; read before the Dublin Society by Dr. Mullen.

Gentlemen,

I Had given you an account before this time of a monstrous Catling that I lately diffected, but that my business would not give me leave to put it in writing till now.

When I met with it, 'twas dead, and I am persuaded that it was so brought forth, the lungs being compact and free from air; which they could not be, if

it had ever inspir'd.

It was double from the navel downwards, having four hind feet, two tails, two anus's, and two pudenda, for they were females. They were join'd in one trunc at the navel, and were continued so upwards; but yet this monster had two pair of fore-feet, one of them on the back and the other on the breast. The head though single had two pair of ears, one naturally sited, and another at the hinder part of the head, between the processus mamillares to which the Vertebræ of both the necks were joyn'd; for there were two back-bones conti-

nued all the way to the head. Though the two bodies feem'd to be but one entire one above the navel.

There was only one stomach under the liver in the right side, reaching under another liver in the left. The guts were single till within 6 or 7 inches of the anus, and there was a division into two branches, one going to each sundament, below the division there were plainly to be seen two cocums, within about 3 inches of the anus each. There were 2 livers, one much smaller than the other; that which was in the right side was the least, the other lay lower down in the left side. They were both entire without any division or lobes. There was a vena umbilicalis inserted into each of them. There were two arteries inserted into the liver in the left side, both coming from the aorta; and these I shall call the celiace. There was only one inserted into the liver placed in the right side. There was no vena cava below the livers, for all the veins coming from the lower parts entred the livers as the vena porta does naturally. There was a branch of a vein on each side, proceeding from the loins inserted into the back parts of the liver, and besides these there was not a branch to be seen but what was inserted into the middle of the liver.

There were no vesiculæ felleæ that I could find, and perhaps the reason I could not discover any, was, because of the tenderness of the livers; for they were putrissed before I got the Catling. There were two kidneys on each side furnish'd with ureters. There was neither spleen nor pancreas in either side.

There was a double diaphragm meeting in the middle between the two backbones, and making a membrane, which to me seem'd to be a mediastinum; for

it reached up to the thymus.

There were two hearts in it, one placed above the other, and a little to the right fide, it was much higher than ordinary, and it had a vein coming to it from the little liver in the right fide, which (together with 3 other small veins, one from each of the fore-feet and one from the head) furnish'd this heart with what blood was to be circulated by it. It had only one auricle, and one ventricle, so that it seem'd to be but half a heart. There was a pretty large passage into the arteria aorta, the contrivance of which was very singular. For above this heart it was made like an arch of a circle, into which there was a direct passage from the heart for the blood. When I further examined this artery, a found that it went down on each side on the Vertebræ of the backs between the kidneys, and divided it self on each side after the usual manner after it had lent each kidney a branch, the liver in the right side one, and the liver in the left side two.

Below the former a little towards the left fide of it, there was another half heart, having only one auricle and one ventricle like the former. This received little blood but what was transmitted from the large liver in the left fide by that that is called the truncus ascendens of the vena cava.

The artery carrying the blood from this heart was inferted into the artery

lately describ'd as well as that of the other heart.

So that if the blood circulated through either of them, the whole animal must necessarily be supplied with blood; a contrivance not unlike that of the arteries

arteries under the brain, where the arteriæ carotides and vertebrales do empty themselves into one common channel, from which all parts of the brain may easily be supplied with blood.

The head was join'd to two necks about the processus mamillares.

There were four orders of ribs, though the body was but one above the navel. That which outwardly feem'd to be a back was really the place where the ribs met, and which might be rather call'd the breast, though it wanted a sternum.

A Letter from Mr. St. George Ash, Sec. of the Dublin Society, to one of the Secretaries of the Royal Society; concerning a Girl in Ireland, who has several Horns growing on her Body.

Trin. Col. the 10th of Octo. 1685.

Hon. Sir,

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HE account I here send of the Horny Girl, is much more impersect than I hoped it would have been, both because its parents or friends, who might give some information of the beginning and occasion of the growing out of these horns, are not to be sound, and that the owner of this monster would not be persuaded to let us take the figure thereof, which we design'd to present you

She is call'd Ann Jackson, born in the city of Waterford, of English parents, who are both said to have been sound and healthy; this infirmity did not shew it self, till she was about three years old, after which the mother concealed her out of shame, and brought her up privately; but she soon dying, and the father becoming exceeding poor, the child was left as a charge upon the parish. She is now between thirteen and sourteen years of age, yet can scarce go, and is so little in stature, that I have seen children of five years old taller; she is very filly, speaks but little, and that not plainly, hastily, and with difficulty, her voice is low and rough; her complexion and sace well enough, except her eyes, which look very dead, and seem to have a film or horn growing over 'em, so that she can hardly now perceive the difference of colours.

The horns abound chiefly about the joynts and flexures, and not on the brawny fleshy parts of her body, they are fastned to the skin like warts, and about the roots resemble them much in substance, tho' towards the extremities they grow much harder and more horny; at the end of each finger and toe, grows one as long as the finger or toe, not strait forwards, but rising a little between the nail and the flesh (for near the roots of these excrescencies is something like a nail) and bending again like a turky's claw, which too it much resembles in colour; on the other joynts of her fingers and toes are smaller ones, which sometimes fall off, others growing in their places. The whole skin of her feet, legs and arms, is very hard and callous, and does daily grow more and more so;

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on her knees and elbows, and round about the joynts are many horns; two more remarkable at the point of each elbow, which twist like rams horns, that on the left arm is above half an inch broad, and four inches long; on her buttocks grow a great number, which are flat by frequent fitting; at her armpits and the nipples of her breasts, small hard substances shoot out, much slenderer and whiter than the rest; at each ear also grows a horn; the skin of her neck does of late begin to turn callous and horny, like that of her hands and seet. She eats and drinks heartily, sleeps soundly, and performs all the offices of nature like other healthy people, except that she never had the evacuation proper to her sex. This, Sir, is as particular an account as I can gather.

I am,

Honoured Sir,

Your very Humble Servant,

St. GEORGE ASH.

A Letter from William Molyneux Esq; to one of the Secretaries of the Royal Society, concerning the Circulation of the Blood, as seen, by the Help of a Microscope, in the Lacerta aquatica.

Dublin, October 27. 1685.

Sir,

Our Society lately received transcripts of two of Dr. Garden's Letters, the first dated from Aberdeen, July 17. 1685. to Dr. Middleton; the other September 4. 1685. to Dr. Plott. To both these letters I have something

to fay.

In the first he gives an account of the visible circulation of the blood in the Water-newt or Lacerta aquatica; truly I am heartily glad, that this learned and ingenious Dr. has hit upon this experiment; 'tis now above two years and an half, since I first discovered this surprising appearance, and wrote a large account thereof, May 12. 1683. as also of the whole anatomy of this animal, to my brother, who was then at Leyden. And I have since that, shew'd it frequently, both on the out-side without distinction, and in the inward vessels also, to several curious physicians and philosophers, to their great satisfaction and admiration; particularly I exposed it first to our society, May 26. 1684. as appears by the following minute taken from our registry. May 26. 1684.

Molyneux opened before the company a Water-newt, which he takes to be the Salamandra or Lacerta aquatica, in the body of this animal there are two long facculi aerii, on which the blood vessels are curiously ramified, to these blood vessels, applying a microscope, he shewed the circulation of the blood ad oculum, as plainly as water running in a river, and more rapidly thin any common stream. The same experiment I repeated again before them on the 2d of June following, and to those that had good observing eyes, the circulation was as visible outwardly on the hands and toes, as in the vessels within. But certainly the appearance in the vessels on the two forementioned sacculi, with the beating, emptying and filling of the heart, is most surprising to the beholder. This creature seems wonderfully adapted by nature for this experiment; for besides the transparency of its skin and vessels, I have had them live nine hours after they have been expanded, and all their viscera laid open.

To Dr. Garden's 2d letter I have only this, he endeavours therein to explain and give an account of the trade-winds within the tropicks from the different gravity of the atmosphere at divers times of the year. And yet it is afferted, Numb. 165. page 790. of the Philosophical Transactions, That the mercury is not affected with the weather, or very rarely, let it be cloudy, rainy, windy, or servene, in St. Helena, or the Barbadoes, and therefore probably not within the trapicks, unless in a violent storm or hurricane. Now if the mercury move little or nothing in the baroscope, 'tis likely there is little or no change in the gravity

of the atmosphere within the tropicks.

I am,

Your most humble Servant.

WILLIAM MOLYNEUX.

The great Age of two Persons in Ireland, by Dr. Tho. Molyneux.

Y lord Bacon fays, that the countess of Desmond, in Ireland, was one hundred and forty years of age.

Mrs. Eckleston, who lived at Philipstown in the King's-county, was born in the

year 1548, and died 1691; so she was 143 years old.

Part of a Letter from Mr. Ray, F. R. S. to Dr. Sloan, giving an account of the poyfonous Qualities of Hemlock-water-dropwort.

I Shall now communicate to you, a story or two of the diresul effects of Oenanthe aquatica, Cicutæ facie succe viroso of Lobel, which we may English
hemlock-water-dropwort, upon several persons that eat of the roots of it,

fent me not long since in a letter from Dr. Francis Vaughan, a learned physician in Ireland, living at Clonmel, in the county of Tipperary. This gentleman observing me, notwithstanding what Dr. Johnson in his Gerardus emaculatus, and Lobel, in his Adversaria had written of the venenose quality of this plant, to be somewhat doubtful of it in my Synopsis methodica stirpium Britannicarum, for my full satisfaction and conviction, wrote the following abstract of a history drawn up by a person, who is at present his brother-in-law, concerning the effects of it upon himself, and seven other young men, who ignorantly mistaking it for

Sium aquaticum, or Apium palustre, did eat of it.

Eight young lads went one afternoon a fishing to a brook in this country, and there meeting with a great parcel of Oenanthe aquatica succe viroso, (in Irish, Tahow) they miltook the roots of it for Sium aquaticum roots, and did eat a great deal of them. About four or five hours after going home, the eldest of them, who was almost of man's stature, without the least previous appearing disorder or complaint, on a fudden fell down backwards, and lay kicking and sprawling on the ground, his countenance foon turn'd very ghaftly, and he foamed at the mouth. Soon after four more were feized the same way, and they all dy'd before morning, not one of them having spoken a word from the moment in which the venenate particles surprized the genus nervosum. Of the other three one ran stark mad, but came to his right reason again the next morning. Another had his hair and nails faln off, and the third (who is my brother-in-law) alone escaped without receiving any harm: whether he eat less of this fatal root, or whether his constitution, which is to this day very athletick, occasion'd it, I cannot tell. Though I am of opinion, that his speedy running above two miles home, after that he saw the first young man fall, together with his drinking a very large draught of milk, warm from the cow in his mid-way, were of fingular use to him. For his violent sweating did doubtless expel and carry off many of the venenose particles, and had a better effect than perhaps, the best of our alexipharmicks (which you know are generally diaphoretick) might have produced in this case. Besides, I believe the draught of warm milk did act its part, by involving the acid or acrimonious poisonous particles, and rendring them unactive, and preventing their feizing the Genus nervofum, till they were expell'd per Diaphoresin. But this is but my conjecture, which I willingly submit to more mature judgments. This happened about thirty years ago; but there are many yet alive, who affert the truth of it, having been eye-witnesses of this dreadful tragedy. There was also a Dutchman, about two years fince, within eight miles of this place, poisoned by boiling and eating the tops of this plant, shred into his pottage; he was foon after found dead in his boat, and his little Irish boy gave account of the cause of his death, to be eating this herb, which he forewarn'd his mafter against, but in vain, the Dutchman afferting, that it was good fallad in his country; fo that I believe he took it for Apium palustre, which its leaves much resemble. Thus far Dr. Vaughan.

Several parallel and no less tragical histories of later date, of the miserable destruction of divers persons, by the eating of the roots of this pernicious and deleterious plant, I find recorded by Jacobus Wepferus, in his book de noxis Cicutæ

aquitica,

aquaticæ, and in the Miscellanea curiosa or Ephemerides German. Dec. 2. An. 6.

Observ. 116.

Wherefore I think it is for the interest of mankind that all persons be sufficiently caution'd against venturing to eat of this, and indeed any other unknown herb or root, lest they incur the same sate; and in order thereto, that such histories be made publick and transmitted to posterity.

Part of a Letter from Francis Nevil, Esq; to the right reverend the Lord Bishop of Clogher, containing a Relation of several Urns and sepulchral Monuments lately found in Ireland.

Belturbet, December 9. 1712.

My Lord,

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When bishop Hopkins was bishop of Raphoe, there was a whale cast on the island Dowey, which belongs to the bishoprick; which island is about ten miles beyond Castle-doe. This whale carried me into those wild parts of the county of Dunnagal; and whilst I was in that island, and in another adjacent called Innis Bosin, which did likewise belong to the bishoprick, I saw several whales playing for several days together in that sea. The whale that was cast ashore was but a small one, 50 soot long: It was of that kind that hath the whalebone in the roof of the mouth.

When I came back to Caftle-doe, I was told of an urn that was found within a mile of that place; where I went, and met with the man that had found the fame. He carried me into a little island, surrounded with bog, where his cabin stood: the island was very dry, light, sandy ground, which he had plowed: the plow running in some places over flat stones covered above with earth, made the man curious to fearch; and the rather because he was a clothier by trade, he wanting a flat stone to make him a hot-press (for so they do, who want an iron plate to press their cloth on.) In taking up the stone he found a cavity under it. which I believe may be call'd a sepulchre, or tomb: in it he found an urn, which he broke, because nothing was in it but bones and ashes. In the same tomb there were some bones of one about ten or twelve years old. The tomb stood E. and W: the urn was found in the west end; it was the smallest urn I have seen, but the cavity wherein it lay was near five foot long, two foot and a half broad, and about the same depth: it was made up of six coarse flag stones, viz. one on each fide, one at the head, another at the foot, one above and one below: the bones were much wasted, and but few of them. Whilst I staid there, we opened 3 more, which the man quickly found out, because he had made his marks by the plow. These three were much larger than the former; one of the three was near the center of the island, and biggest of all; but all alike made. There was no urn in either of them, and but bones in one, which was the biggest. The bones seem'd to be of a man of an ordinary stature: if there had been any in the other two they were consumed. The man told me he did believe there were more; but I had not time to make a further search. This seem'd to be a common burying place, there being so many of that kind of tombs in it; and one may gather from thence, that at that time they burnt some, and others they did not; because here was an urn found with bones burnt, and there were bones unburnt. This island is situate on an istmus about half a mile over, between the bay of Dunfannaghan and the lough of Kinnevier, near to lieut. general Hamilton's house.

There were three the like urns found in three small stone chests, under a great kern or heap of stones, near to Bann-bridge in the county of Down; which heap being remov'd to help to build that bridge, they were discover'd.

There were the like urns found near Omagh in the county of Tyrone, in the like chefts, under two heaps of stones, which were removed to build some hou-

fes in the faid town.

There was one urn found in a little fandy hill near Cookston on the road to Lisson in the county of Tyrone: it was covered with a great rude li ne-stone; which being removed in order to make lime, the urn was discovered in a hole encompassed with six stones of equal bigness, which made a hexagon, in which the urn stood. The water that had faln on the urn from the lime-stone, or the air condensing, had petrify'd, and made a stony crust on the outside thereof. There were some bones and ashes found in it. Sir Robert Staples had the um and gave it to me, which I design'd for the college; but the fellow I entrusted to carry it broke the same, and so my design fail'd.

At Dungannon in the same county, a servant of mine working in a fand pit near the town, struck on an urn, which was the largest I ever saw. It was found with the mouth whelm'd downward, the boncs and ashes on a flit stone, and the urn covering them: it would have held about three quarts, and had been better burnt in the fire than they usually are: but this met with the sate of others; it was broke by the spade before the man was aware, and had no stones about it as the others, but was bury'd in the earth about a foot under ground. As they dug the bank for sand, the place where the carcass was burnt was discovered by the coals and pieces of bones, which spread a great way, about a foot under

ground.

Near to the same town, on Mr. Knox's estate, in a town-land call'd Killimeille (which in English is lousy-cell, or lousy burying-place) there are on the top of the hill two circles of dry stone about 20 yards in diameter each; they meet on two sides and make the figure of eight. I suppose when first form'd they made a dry wall for two distinct burying-places, one for the men, the other for the women; or rather two repositories for urns. One James Hamilton, who sarm'd the ground from Mr. Knox, wanting stones to build a house, drew off most of them from this place. When he had entred within one of the circles, he found three urns in three several holes, set about with six stones, and covered with slat stones, and and other stones thrown on the top; he broke what he found, not finding what he expected. Mr. Knox and I went there to see the place, and saw the holes

and broken urns; but the man's house being finish'd, there were no more found; but I am persuaded there are many more, because these three were found near together. The poor man met with an accident of fire in his malt-house, which did him great damage; the Irish attributed it to his taking those sto build his house, which they call'd holy, tho' they knew nothing of its being a burying

place, till thus discovered.

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On the same hill about 30 yards distance to the eastward of these circles, upon search we found the altar whereon they used to burn their dead, over-grown with earth and green sod, which we caused to be uncovered: it was made of dry stone, eight foot long and four foot broad, the coals and bones fresh among the stones, and the stones burnt with fire. At the east end of this altar there was a pit, which was likewise over-grown with earth and green sod; which we opened, and found it to be the receiver, where they swept in all that remain'd on the altar after burning. We search'd deep, and the substance was all alike, black and greasy: it had tinged the hill in a strait line from the pit to the bottom of the hill; and discovered it self to our view, the land being then plow'd.

I shall add only one more that I have seen, besides the many that are yearly discovered; to shew that this was the way the Irish had for burying in heathen

time, though the people know nothing of it by history or tradition.

In the county of Farmanagh, upon a hill over Wattle-bridge, there has been a mighty heap of stones, the basis incircled with very large stones standing on end. This heap has been remov'd to pave our ways, and build that bridge; under which there were some urns found in stone cossins, and I believe there are some remaining. These were, I suppose, the urns of some great personages. The heap was so big, and the stones about it so large and so many, that it cost great pains to bring them there: or perhaps there might have been a fight there, and some of the great officers might have their bones interr'd there, and the army made that great work over them; for it seem'd to be a work done by many. I have seen several such heaps in this kingdom, and I doubt not but they are all monuments for the dead. I am, &c.

Francis Nevil

An Account of a large Cave night Drogheda, by Mr. Edward Llhwyd.

The most remarkable curiosity we saw by the way, was a stately mount at a place called New Grange near Drogheda; having a number of huge stones pitch'd on end round about it, and a single one on the top. The gentleman of the village (one Mr. Charles Campbel) observing that under the green turs this mount was wholly composed of stones, and having occasion for some, employ'd his servants to carry off a considerable parcel of them; till they came at last to a very broad stat stone, rudely carv'd, and placed edgewise at the bottom of the mount. This they discovered to be the door of the cave, which had a

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long entry leading into it. At the first entering we were forced to creep; but still as we went on, the pillars on each side of us were higher and higher; and coming into the cave, we found it about twenty foot high. In this cave, on each hand of us was a cell or apartment, and another went on straight forward opposite to the entry. In those on each hand was a very broad shallow bason of stone, situated at the edge. The bason in the right hand apartment stood in another; that on the left hand was fingle; and in the apartment straight forward there was none at all. We observed that water dropt into the right hand bason, tho' it had rain'd but little in many days; and suspected that the lower bafon was intended to preserve the superfluous liquor of the upper, (whether this water were facred, or whether it was for blood in facrifice) that none might come to the ground. The great pillars round this cave, supporting the mount, were not at all hewn or wrought; but were such rude stones as those of Abury in Wiltshire, and rather more rude than those of Stonehenge: but those about the bafons, and some elsewhere, had such barbarous sculpture (viz. spiral like a snake, but without distinction of head and tail) as the forementioned stone at the entry of the cave. There was no flagging nor floor to this entry nor cave; but any fort of loofe stones every where under feet. They found several bones in the cave, and part of a stag's (or else elk's) head, and some other things, which I omit, because the labourers differed in their account of them. A gold coin of the emperor Valentinian, being found near the top of this mount, might bespeak it Roman; but that the rude carving at the entry and in the cave seems to denote it a barbarous monument. So, the coin proving it ancienter than any invasion of the Ostmens or Danes; and the carving and rude sculpture, barbarous; it should follow, that it was some place of sacrifice or burial of the ancient Irish.

DISCOURSE

Concerning the

DANISH MOUNTS, FORTS, and Towers

IN

IRELAND.

Never before Published.

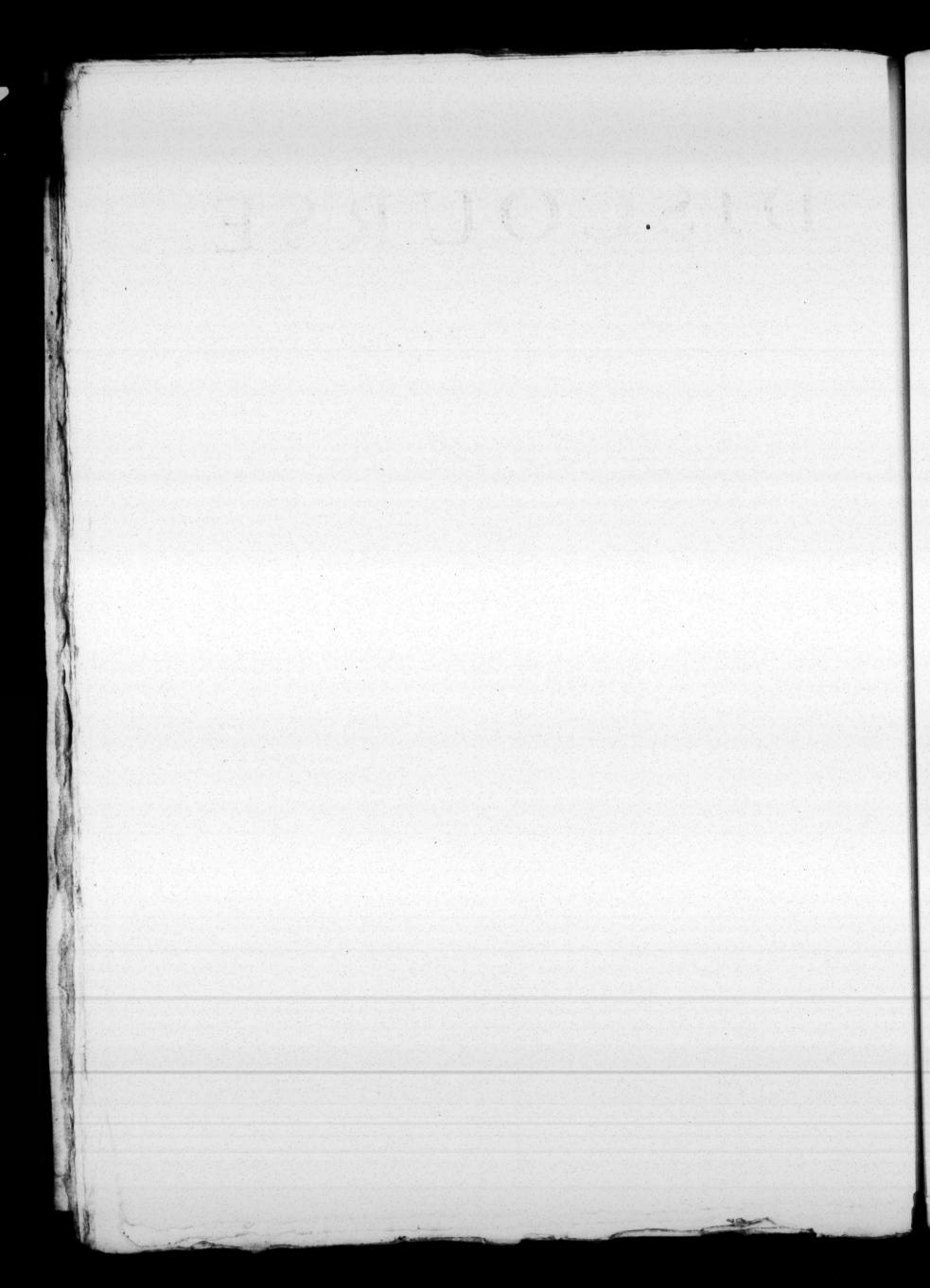
By Thomas Molyneux, M. D. Fellow of the Royal Society in ENGLAND, Professor of Physick in the University of DUBLIN, Physician to the STATE, and Physician General to the ARMY in IRELAND.

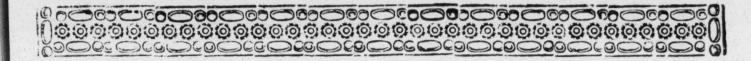


DUBLIN:

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Printed by and for GEORGE GRIERSON, at the Two Bibles in Esex-Street. M DCC XXV.





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DISCOURSE

Concerning the

DANISH Mounts, Forts, and Towers

IN

IRELAND.

Never before Published.



HO' most nations have been apt to fall into the vanity of deriving themselves from a more antient origin than truth or credible authority will vouch for; yet no people have carried this extravagance farther than the natives of *Ireland*, presuming to romance to that degree in their chronicles, as not only to deduce their stock from generations near the flood, but to invent antediluvian stories, and a sable of a niece of *Noah* himself landing in this island.

But passing by these and such like fabulous accounts, as meeting with little or no regard in this age, however they might have gained credit former-

ly, in those dark and ignorant times, when they were first broached by their inventive authors. We may safely, I think, conclude from the original affinity of the old languages of Britain and Ireland, the natural situation of both the countries, their ancient customs, and other convincing circumstances, that the first inhabitants of this island came no farther than from Great Britain, as that kingdom was first peopled by a colony of the neighbouring Celtick Gauls.

For

For had the natives of *Ireland* a real claim to so remote antiquity, and were for so many ages past that polite and well govern'd nation their histories wou'd make us believe they were; 'tis not to be imagined but that in so long a series of time, arts, learning and mechanicks, wou'd have so far improved, as to have produced some monuments of one kind or other, whose remains, as undeniable testimonies, might convince posterity, they truly were, in those early times,

that learned and civilized people they pretend to have been.

But 'tis fo far from this, that of those few relicks of antiquity that still remain in this country, none that I have met with claim a very antient date; and what is more observable, the oldest monuments of human industry that Ireland shews at this time, proves to have been the workmanship, not of the first inhabitants, but foreigners, a strange nation that invaded and settled in this island, some time between the eighth and ninth century after Christ: I mean those large high artificial hills that we call Danes-mounts, which being so frequently met with in all parts of the kingdom, and so remarkable for their towring height, vast magnitude, and regularity of their figure, as well as their antiquity; I have often wondred how it comes to pass, that hitherto they have not stirred up the curiosity of some in this country, to give us a more particular account of them.

'Tis true indeed, if we take only a transient view of their out-sides, they'll seem not much to engage our enquiry, shewing no great mastery or extraordinary invention in the first founders, nor any refined contrivance, or elaborate workmanship in their composition. But if we consider them a little more narrowly, we must allow they are model'd after such a manner, as wisely and effectually to answer the ends for which they were first designed, that is, to be signal and lasting monuments in future ages, to preserve the memory of that peo-

ple by whom they were first raised.

Their figure and make are contrived so durable, as to require no sort of repair: they must continue for many ages in the same state, tho' never so much neglected by posterity, defying the injuries of the weather, and all the usual assaults of devouring time: they have already stood several centuries, in spite of all the malice and insults of the Irish, tho' a most implacable enemy of their sirst sounders, and must out-last the most artful pieces of architecture the Ramans, or more refined Greeks, have lest behind them: nay, we may truly say, of the sairest and largest of these mounts, that nothing is likely wholly to deface them, but what at the same time must put an end to the frame of the globe it self.

These fort of pyramids or artificial hills, are found not only in this country, but in some parts of England, tho' not near so common, nor as I think so large as ours. The English call them barrows or burrows, from the old Saxon word, beorg or burg, a hill, from whence we derive our modern word to bury, and burial, as the Latins us'd the word tumulus to express both a hill and a grave. As to the reason of this ambiguous use of the same word in these different languages, we may take occasion to say more hereafter in discoursing upon the original of sepulchral monuments. The old Irish or Scots call them carns, which

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in their language fignifies a heap, but more especially of stones piled together, of which some are composed, as others are of earth: with the English of Ireland they pass under the name of Danes-mounts, from a current and constant tradition receiv'd from the Irish, that they were first raised by the Danes when they were

in possession of this country.

But by Danes we are not to understand a people that came only from that country we now call Denmark, but colonies of promiscuous nations inhabiting Norway, Livonia, Courland, and that vast tract that borders on the Baltick sea, that joining together, made invasions on this and the neighbouring countries, which they found more fruitful and temperate than their own, about the eighth century: and are represented by the histories of those times as a warlike people, noted for their incursions upon their neighbours, for pyracy, for commerce, and for introducing a better fort of coin'd money into trade, than was current in these parts before their time, which has retained their name by passing under the denomination of sterling to this day.

For in that age these people were not known by the name of Danes, but being made up of several nations, got the more general appellation of Ostmanni, Ostmens or Easterlings, as coming from a country of Europe that lies east of these issands, and which our merchants trading to those parts still call the eastlandcountry; and in our own memory, a confiderable quarter of Dublin, fituated on the north fide of the river, was called Oftmen-town from these Eastmen that first

inhabited that part of the city.

These Ostmanni or Danes after making several invasions, fighting many battles, and fettling treaties with the inhabitants of this country, reduced the whole ifland to their obedience, and kept it so for a long time by their numerous garrifons and forts, as we find them at this day dispersed in all parts of the kingdom, till the native Irish, tired with the subjection, made several attempts to free themselves and their country from the yoke of these foreigners; and at last by repeated insurrections, fought the Danes with that success, as forced them to quit the possession of all the inland parts of the country, and betake themselves to the seaport towns of Drogheda, Dublin, Waterford, Cork, Limerick Kinsale, Galloway and Sligo: for the first founding and building of these cities, I take to be chiefly owing to the Danes; where securing themselves, they lived more peaceably, made convenient settlements for trade, and carried on a considerable commerce abroad, as well as an inland traffick with the natives at home. And hence it is that these fort of mounts, as well as other remains of the Danish nation, are more frequently met with along the coast, near the sca-port towns and the territories about them, than in the countries that lye more remote within land.

This may serve as a short account of the Danish affairs in Ireland, from the time they first got footing in this country, till the English conquest in Henry Il's reign, about the year 1171. which contains the space of almost 400 years, during which time all these artificial mounts were raised in this kingdom: and from whence it comes to pass they are more numerous, and some of them larger than those of the same fort found in England: because the Danes were masters of that country not above 40 years, whereas they were conquerors or inhabitants of Ireland As

near 400 years together.

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As to the outward shape of these mounts, they are made in form of a cone, lessening gradually as it rises from a large basis, till it terminates at the top, not in a point but a flat surface. They are commonly situated, especially the largest of them, upon rising grounds, near some publick road, to be conspicuous at a

distance, and taken notice of by travellers as they pass that way.

And agreeable to this description, we find an account of the like mounts given us by an old Danish author, Joannes Cypreus, as raised by the Danes in former times in their own country. (a) The Danes (says he) in the time before they could build pyramids, or raise obelisks to the memory of their kings and great men, erected over them vast billocks of earth heapt as high as mountains, and chiefly in such places through which men commonly travelled, as high roads and publick passages, that by this means they might consecrate to posterity the memory of their most celebrated men, and in a manner make them immortal.

Tho' all these mounts agree in the same conical figure, yet they differ much in their size, some being low and small, others much more large and lofty: some not above twenty foot high, others twice and sour times that height; nay, some of the largest and most beautiful rise from the horizontal level a hundred and sifty foot at least in the perpendicular, and at the bottom extend themselves proportionably in their circumference. These great differences in their size arise certainly from a difference in the character, dignity or power of the person for whom they were erected; for as he was a general, prince, or officer, more or less eminent in his station, or deserving of his country, they exprest their gratitude, and shewed him the greater honour, by raising a monument more or less

stately and elevated to perpetuate his memory.

We find likewise a difference in these mounts, as to the material of which they are composed; some are only made up of earth heapt together, others of small round stones, sew of them larger than those we commonly pave our streets with, so piled as with a little sand or earth mixt, they make a round high cone. Of both these sorts, Olaus Wormius the Dane, a diligent and learned enquirer into the antiquities of his country, takes particular notice, as still remaining in Denmark, where, he says, monuments, as to the matter of which they are composed, shew themselves to be of two sorts, made either of earth or stone (b). And the reason of this distinction I take to have been occasioned only by the nature of the soil, where they chanc'd to erect these mounts: for if the country afforded a sufficient quantity of stones to raise such a monument as they designed, they usually gave the stones the preference before the earth, as being the harder and more durable material: and hence we find the largest mounts, such as they proposed

(b) Monumenta quoad materiam ex qua tabricata, vel terrea vel lapidea sese nobis offerunt.
Olaii Wormii monument. Danic. lib. 1. cap. 2. pag. 4.

⁽a) Dani cum pyramides et obeliscos extruere non potuerunt, olim in memoriam regum ac heroum suorum ex terra coacervata ingentes moles montium instar eminentes statuerunt, atque illis adeo in locis utplurimum quo sæpe homines commearent aut iter haberent, ut in viis publicis, quo posteritati memoriam clarissimorum virorum consecrarent, et quodammodo immortalitati mandarent.

Joan. Cypreus in Annal. Eccles. lib. 1. cap. 2.

should be most lasting, and in the embelishing of which, they employed the utmost art those rude times were masters of, are made of stones: but where stones did not offer themselves, or could not be procured without difficulty, as usually they cannot where the soil of the country is rich and flat, they used earth only; every soldier bringing his helmet sull of earth, till the whole army had raised a sufficient tumulus or mount over their commander, answerable to his dignity: and it was this sort of burial, as I take it, that the ancients, particularly Quintilian, call Sepultura collatitia, an interment to which many hands contributed.

Another no less observable difference occurs in these sepulchral hills, that some of them are adorned by being encompassed with a circle of large high stones, of a rude pyramidal figure, set in the earth end-ways, at equal distances, round the bottom of the mount. These stones are higher or lower, in proportion to the height of the hill they surround; and, we may conclude, were accounted an extraordinary ornament, for they are rarely met with, and wherever they are placed, they stand as marks of distinction of the person round whose tumulus they are erected, to show he was of a more than ordinary station or dignity in his life-time.

This Olaus Wormius likewise observes, in the Danish monuments of his own country, where he says, (c) The more rude and ordinary fort of mounts, confist only of earth, heaped together into a round conical figure, but such as are encompassed at the bottom with one range of stones, are thought to have been dedicated to the generals of armies, or the greatest of their nobility: whereas those that are plain and not adorned with stones, are only raised for valiant soldiers, and such as deserved well of their country.

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'Tis true from an outward view only of these mounts, it does not appear they were erected as sepulchral monuments: for I never could hear that in Ireland there has been found an epitaph, inscription, or any such like remain near any of these hills; and therefore we have good reason to question, whether their first founders were masters of letters at all: however, when we come to examine them closer, and look into their insides, we shall find such discoveries in some of the cavities and apartments that lie placed toward their centres, which will make this matter plain, and indeed put it beyond all dispute.

That such sort of artificial hills as these we are discoursing of, were raised in the most remote ages of antiquity, as sepulchres for the dead; I think, plainly appears from several passages in the oldest authors, and especially from those verses in Virgil, where that correct poet, designing to give us the true idea of an antique funeral monument (raised over an antient king of the Aborigines that governed old Laurentum, long before Eneas his time) he thought he could not

B I

describe

⁽c) Tumuli rudiores ex solà terrà in rotunditatem & conum congestà constant, at ex iis qui una lapidum serie circa basin cinguntur, imperatoribus exercituum aliisque magnatibus dicati creduntur; ut simplices nullis ornati lapidibus, militibus strenuis & de patrià bene meritis.

Olaii Wormii monument. Danic. lib. 1 cap. 6. pag. 33.

describe it with more propriety, fitting that distant age of the world, of which he spake, than in these words.

Fuit ingens monte sub alto Regis Dercenni terreno ex aggere bustum Antiqui laurentis. Æneid. lib. 11.

There like a mountain rose a losty hill, In which old Laurent's king Dercennus lay, Stately interr'd, tho' in a tomb of clay.

And Lucan the poet seems to have imitated this thought of Virgil, or at least certainly alluded to this antient manner of burial, where he says,

Et regum cineres exstructo monte quiescunt. Phars. lib. 8.

Under a mountain rais'd by hands they keep Kings facred ashes that securely sleep.

And that this kind of interments under high artificial mounts, was practifed in the time of Alexander the Great, we have a plain example in a remarkable passage of Plutarch, in the life of that prince, where describing the suneral of Damaratus the Corinthian, he says, that the old man, making a visit to Alexander then in Asia, sell sick in the camp, died, and had a most magnificent suneral; the whole army raising him a monument of earth, sourscore cubits high, and of a vast circumference: but however august and elevated Plutarch imagined this suneral pile of Damaratus, we have mounts of the Danes in Ireland that sar surpass in height and magnitude this of the Corinthian.

But that this practice of raising great heaps of earth or stone over dead bodies, prevailed even some hundred years before Alexander's time, appears by the description we have of Absalom's burial, in the history of the kings of Israel, where 'tis said, they cast his body into a great pit, and laid a very great heap of

stones upon bim. 2 Samuel, cap. 18. v. 17.

And we might add feveral other such like passages from the antientest authors, did it seem any way needful; but the custom of burying under artificial mounts, appears of it self, without much authority or proof, so truly antient, that to make this plain we need only consider the manner the first generations of mankind must necessarily use in burying their dead. That the earliest rites of burial, like all other customs and fashions, when first introduced, must have been very rude, simple, easy, and void of all art, must be readily allowed; and that our ancestors, in the beginning of time, when they were forced to remove so loathsome an object from their senses, as their dead putrifying bodies, were content only to dig a hole, much of the same size with the body it was to receive, and with the mold they had thrown up, just cover the corps, by casting

it back again: and this it self could not be done, but the earth, as it sell in covering the grave, necessarily formed a tumulus or heap, (which gave occasion for the use of that Latin word in a double sense) and naturally raised of it self a

kind of low pyramid or mount over the interr'd body

But as the friends and dependants of fuch as died in after-ages, were more numerous, had acquired more wealth or power, and had inclinations to express more affection, gratitude or honour, towards the memory of their deceased relations, they attempted shewing this, by expressing marks of distinction in the sepulchral monuments of their friends, that might in after-ages render them more conspicuous and lasting, and distinguish them from the sepulchres of the more common fort. And in those early and barbarous times, before invention had improved, or even discovered the art of architecture, this could not be effected by a more plain and eafy way, than by raising, instead of the mean humble tumulus, that naturally covered every common grave when it was made, a larger, higher, and more lasting pile of earth or stones; employing only somewhat more time, labour and hands, to perpetuate, as far as they might, without art or letters, the memory of the dead to late posterity. And this I take to be the first and true origine of all these mountain-sepulchres, that seem to have been a fashion of the greatest antiquity in most countries, and to have spread as far as mankind it felf.

And I am persuaded, that the models of the most antient, as well as sumptuous monuments of human art, that the whole world can shew at this time, the pyramids of Ægypt, were at first copied from these more antient sepulchral mounts; and that they were only expensive imitations, or, as we may say, more artistical improvements of these sort of rude pyramids of earth, both being de-

figned for the same end and purpose, Sepulchres for the dead.

And I am inclined to think, that those lofty agulio's and stately obelisks of Egypt, that with vast expence and pains have been brought into Europe, and of which some refined antiquaries have given us such learned and elaborate discourses, were nothing else, but sepulchral monuments, or a kind of pyramids of a more modern date, cut after a more slender nicer model, to shew more art; or, that the pyramids are but a larger, ruder, and antienter fort of obelisks; all of them derived at first, and intended only as pompous and artful imitations of the natural humble tumulus, that rises over every corps, when it is at first committed to the earth.

I am not ignorant that some, and those learned men, give us quite another account of the pyramids of Ægypt, and fancy they were designed as granaries or stores of corn, deriving their name from news triticum or corn: but this and such like forced etymologies, are owing only to an accidental chiming or agreement of the sound of the words together, and seem started rather to shew invention, reading, or criticism, than to discover truth: but if any doubt, and require surther satisfaction in this point, they may have recourse to the learned Dr. Grave's most excellent account of the pyramids, where, from the oldest Greek historians, and his own judicious remarks upon the place, he makes it undeniable, they were crected as sepulchres for the Ægyptian kings: however, it may not be altoge-

quirer chanced to overlook, of as great, if not greater authority, than those he quotes, and plainly shews the pyramids were rais'd as sepulchres for the dead,

and puts what has been faid before still in a clearer light.

Tis the description of a sepulchral monument, that Simon the Jewish captain, who sought against Antiochus in the time of the Machabees, erected in honour of his family, as we have it set down in the apocrypha very particularly in these words. And Jonathan was buried at Bascama, then sent Simon and took the bones of Jonathan his brother, and buried them in Modin, the city of his fathers; and all strael made great lamentations for him, and bewailed him many days. Simon also built a monument upon the sepulchre of his father, and his brethren, and raised it a-lost to the sight, with hewn stone behind and before: moreover, he set up seven pyramids one against another, for his father, his mother, and his four brethren; and in these he made cunning devices, about the which he set great pillars, and upon the pillars he made all their armour for a perpetual memory, and by their armour ships carved, that they might be seen of all that sail on the sea: This is the sepulchre which he made at Modin, and it standeth yet unto this day. Mac. cap. 13.

Here is a fair account of an antient stately sepulchre, erected by a Jewish prince in Palastine, near two thousand years ago; composed of seven lostly pyramids of stone, raised so high as to serve for land-marks to the ships at sea, truly modelled after the manner of the pyramids of the Egyptians, from whom the Jews, 'tis plain, frequently borrowed their rites and customs; and so contrived, that the pyramids just answered the number of the persons to whose memory they were raised. For Simon set apart in this his family-monument, a pyramid to cover his own body when he should die, as he designed the rest for his four brothers, his mother and his father; as if no structure of this kind could be compleat, unless each corps had their respective tumulus, obelisk, pyramid, or sto-

ny mount, (call them as you please) to cover their grave.

But leaving these pyramids of Judea and Ægypt, let us return again to our own ruder pyramids of Ireland, the Danish mounts: and since we have hitherto surveyed only their out-sides, let us now pass a little forwards, and see what may be discovered in their inward parts. And tho' we have here found remarkable variety, yet I doubt not but much greater still might be made appear, did our curiosity in this place lead us to make stricter search into such like Danish antiquities, by digging up and disclosing the insides of more of these sorts of mounts: But by what inquiry I have made, 'tis plain they must have been design'd all

for the same purpose; as tombs or burying places for the dead.

Some were erected on the account only of a fingle person of eminence and dignity, and these were so contrived, that the cavity or vault made for reception of the dead body, lies towards the centre of the mount, with all the earth or stones so equally heapt round it, of all sides, as no passage or entry is lest to go in at from without, because it was not intended that it should be opened any more. Such a mount as this was dug into, and the vault broken open near Trinity-college in Dublin, about the year 1646. and in it a man's bones were found.

Others were raised with a design of serving as burying places for more than one; for two or three persons or a whole family together. And mounts of this sort have lest in them on one side or other, a straight, long, narrow gallery or passage, with a small hole or entrance that a man can but creep in at, and that with some difficulty. This long passage leads to an inward vault or chamber, that lies at the centre or pretty near the middle of the mount; and it was only opened as occasion required for the interment of some of the samily; and afterwards was closely stopt, and so industriously conceal'd, that rarely it happens the entrance into any of these passages is discovered. We have a remarkable mount of this kind at New-Grange in the county of Meath, of which I shall have occasion to say more hereafter.

A third fort was cast up as monuments to cover great numbers of slain soldiers, that sell together in some remarkable battle, where whole armies had ingaged: and such mounts have no inward apartments or hollow chambers, as the former, but are only promiscuous heaps of earth and stones so flung together as to raise a mount over the bodies of the slain. And these are found by digging into them, to contain not only the bones of men but arms, spear-heads, and such

like other instruments of war.

Olaus Wormius likewise takes particular notice of this kind of mounts, and defcribes them thus. (d) Those that fell in battle they flung together in a heap, which they call valcoster, and over these they raised the earth so high that it became a hill: and such a one I take that mount to have been, which some years since was open'd near Carricksergus in the north of Ireland, where several Danish trumpets of brass were found buried in the earth, such as they used in war in those times, of a peculiar odd make. Figure the first shews the shape of one of these, and my much esteemed acquaintance, fir Andrew Fountaine, had two more in his possession; both which were carried for England when he went from hence.

Figure I.

From a to b the length was about a foot and a half, the diameter of the open at the widest end b about four inches; c and d were two loose rings, by which it was fastned or hung about those that carry'dit; the smaller end a was entirely close, and the hole they blew at when they sounded, was on one side at e, not at the end as in our modern trumpets: what fort of noise, those that had skill in sounding this kind of trumpets could make with it before it had been any ways impair'd by time, I cannot say, but at present when it is blown, it gives but a dull, uncouth, heavy sound, that cannot be heard at any great distance.

Those Danish mounts that were contrived with chambers or hollows under them, have their caves fashion'd after a different manner, as the different design or fancy of the builder led them. In some the tomb was only an oblong square,

⁽d) Bello occisos in unum cumulum conjiciebant quem valcoster vocabant, & supra eos terram exaggerabant utin monticuli speciem agger excressers.

Ol. Wormii monumen. Dan. lib. 1. cap. 7. pag. 43.

about three foot broad and fix foot long, made up of large flag stones set edgeways, with others laid across to cover them, making a fort of stone box, of a convenient size and cavity to receive a dead body. This square apartment sometimes had four rude agulios or slender pyramidal stones set end-ways, one at each corner, and a fifth taller than the rest at the head; and over all this was heap'd the mount of earth or stones, to cover and preserve the tomb within from the injuries of time, and to make the appearance of a large conspicuous and lasting monument to suture ages from without.

Of such a sepulchre sir James Ware (e) gives us the description, as it was discovered in a Danish mount opened in the east suburbs of Dublin in his time, from

whence we have borrow'd its figure. See Fig. 2.

Figure II.

a, b, c, d, are four rude pyramidal stones, each four toot high, fastned into the ground at the four corners of the tomb: e is a fifth pyramidal stone somewhat of a larger size about six toot high, placed at the head of the tomb: f that was made of square stones, eight in number, compactly joined together, within

which lay the body of a man

The vaults under other Danish mounts are usually cast into a round figure, with side walls of huge large quarry stones, set end-ways into the earth and closed at the top, by a rude kind of arch, made of broad stones laid horizontally, in such a manner that the stone above, jetting its edge a little beyond that which lies under it, they all support one another without any cement or lime to fasten them; for in that time, the rude architects of these fabricks seem to have been wholly ignorant of the use of lime and morter: and they made these caves smaller or larger as the dimensions of the mount that was to cover them would allow; or as it was designed for the reception of the dead bodies buried intire, or only as a repository where they placed one or more smaller urns, containing the bones and ashes of burnt bodies; after the ancient custom of the Romans: for we meet with both these kind of interments in several parts of this kingdom, as practis'd by the Danes whilst they resided here.

Which minds me of an error some have too hastily run into, that think the Romans conquered Ireland as well as Britain; because that urns are frequently discovered in this country as well as that; taking it for granted, that no nation in these western parts of the world, but the Romans, burnt their dead. Whereas the ancient Germans, from whom the Danes and northern people derive their customs as well as their original and language, burnt their dead after the manner of the Greeks and Romans. For that this practice prevailed among them before the age of Tacitus the historian, is plain from a passage in that author, where describing the manners of the old Germans, he expressly tells us, They, (f) mean-

⁽e) Jacob. Varæi antiquitat. Hibern. cap. 32. pag. 348.

(f) Funerum inter illos nullam esse ambitionem, id solum observari, ut sunera clarorum virorum certis lignis crementur.

Tacit. de moribus Germanorum.

ing the Germans, were not pompous in their funerals, but observed the custom of burning the bodies of their most famous men with certain sorts of woods. And Christianus Cilicius a Danish writer, speaking of the ancient customs his countrymen observed in burials, says, (g) Some, tho' but few burnt their dead bodies on funeral piles

after the manner of the Romans, and gathered the ashes into urns.

And Olaus Wormius his account of the mounts, vaults, and urns deposited in them, containing the burnt bones and ashes of the dead, frequently discovered by himself in Denmark; so exactly agrees with the description of the mounts, caves, and urns we find in Ireland, that had we no authority or tradition for it, I think we could not well question, but that these with us, are the remains and workmanship of the same nation that those were which he describes. (b) They (says he) burnt the dead bodies, and gathered the ashes into urns, and placing them in the middle of a circle, surrounded with large stones, they covered the top with a broad one: then over all heapt stones with earth and sand, till they had raised a little hill, like a mount, which they covered with a coat of green sods that it might appear beautiful in the eyes of the spectators that past that way.

Such a mount as this describ'd by Wormius compos'd of sand and stones, raised to a pyramid of 60 foot in height and 600 foot in circumference, with a round vault within, was laid open about the year 1678. near Headford 12 miles from Galloway in the province of Connaught, and in the middle of the cave were found two urns, a greater and a less, both of them containing ashes and burnt bones.

And not far from Waringstown in the county of Down, another mount of this kind was broken open about the year 1684, by the country people that wanted stones to repair a mill: and carrying away about a fourth part of the stones that made the heap, they met in the body of the mount, with a large flat quarry stone placed upright in manner of a door or shutter; which when they had removed, let them into a narrow low passage of about ten foot long, thro' which a man could only creep on his hands and knees, that led into a small round vault about fix foot high and eight foot wide, placed in the center of the mount: in the middle of the vault were fixt into the ground four small long stones, each about two foot and a half high, standing upright as so many legs to support a flat quarry stone, two foot and a half long and twenty inches broad, placed upon them in manner of a table. This rude stone table seemed design'd by the heathen founders as an altar to offer sacrifice upon for the deceased, as will appear plainer by something we observ'd in other Danish mounts in Ireland; of which more hereafter. Under the table on the ground was placed a handsome earthen urn, of a dark brownish colour, as if not throughly bak'd, the thickness of its sides

(g) Nonnulli quoque sed pauci exstructis rogis more Romanorum cremari cineresque collectos in urnă custodiri volebant. Christian. Cilicius belli Dithmarcici. lib. 1.

⁽b) Defuncti cremabant cadaver cineres collectos urnis includebant ac in circi meditullio locatos, grandioribus undique stipabant saxis, superinjecto latiori quo cætera tegerent
hinc totam aream sapidibus, arena glebaque terrestri replebant ac in formam monticuli desuper collem extruebant, quem demum cespitibus tegebant, ut viriditate sua oculos prætereuntium recrearet.

Ol. Worm. monument. Dan. lib. pag. 41.

not more than a quarter of an inch; and it contained broken pieces of burnt bones mixt with the ashes and fragments of burnt wood.

Figure III.

Figure the third expresses the exact shape and full dimensions of the original urn, with all its outward ornaments of work, that shew a greater mastery of skill and art than what I have seen on several other urns found in this country, and more than one might well expect from so rude a people in so barbarous an

age.

Another urn, but of another make, fize and material, was twelve years fince discovered in a mount at Knowth, a place in the county of Meath, within four miles of Drogheda; 'twas found inclosed in a square stone box, about five foot long and four foot broad, made of four rude large flag stones set together edgeways. The urn it felf was one great heavy stone, of an oblong round figure, somewhat of the shape of the upper part of a man's scull, but five or fix times as large; 'twas of a fandy greet like freestone, but much courser and harder; its length about fixteen inches, about twelve in breadth, and eleven in height, its cavity but shallow, not above five inches deep, rudely hollowed by cutting out fome part of the stone, in which was found loose fragments of burnt bones: they feem to have taken pains in adorning the outfide with rude lines and carving, yet the work shews more the labour than skill of the artist, who has graved five furrows one above another, round the upper part of the urn; and in the middle of each fide, and at each end, rude figures, expressing, as I take it, the great luminaries of the world, the fun and moon: and I'm the more inclin'd to favour this conjecture, because 'tis sure, these two calestial bodies were very religiously adored by all the northern nations in time of paganism. From whence it is that of the days of the week, two were folemnly dedicated to the deities of the fun and moon, and have retained their names ever fince.

This urn, now in my possession, being a singular piece of Danish antiquity, and the only one of stone I have heard that has been found in this or in our neighbouring island; I thought it well deserved to be exprest by the two following

figures.

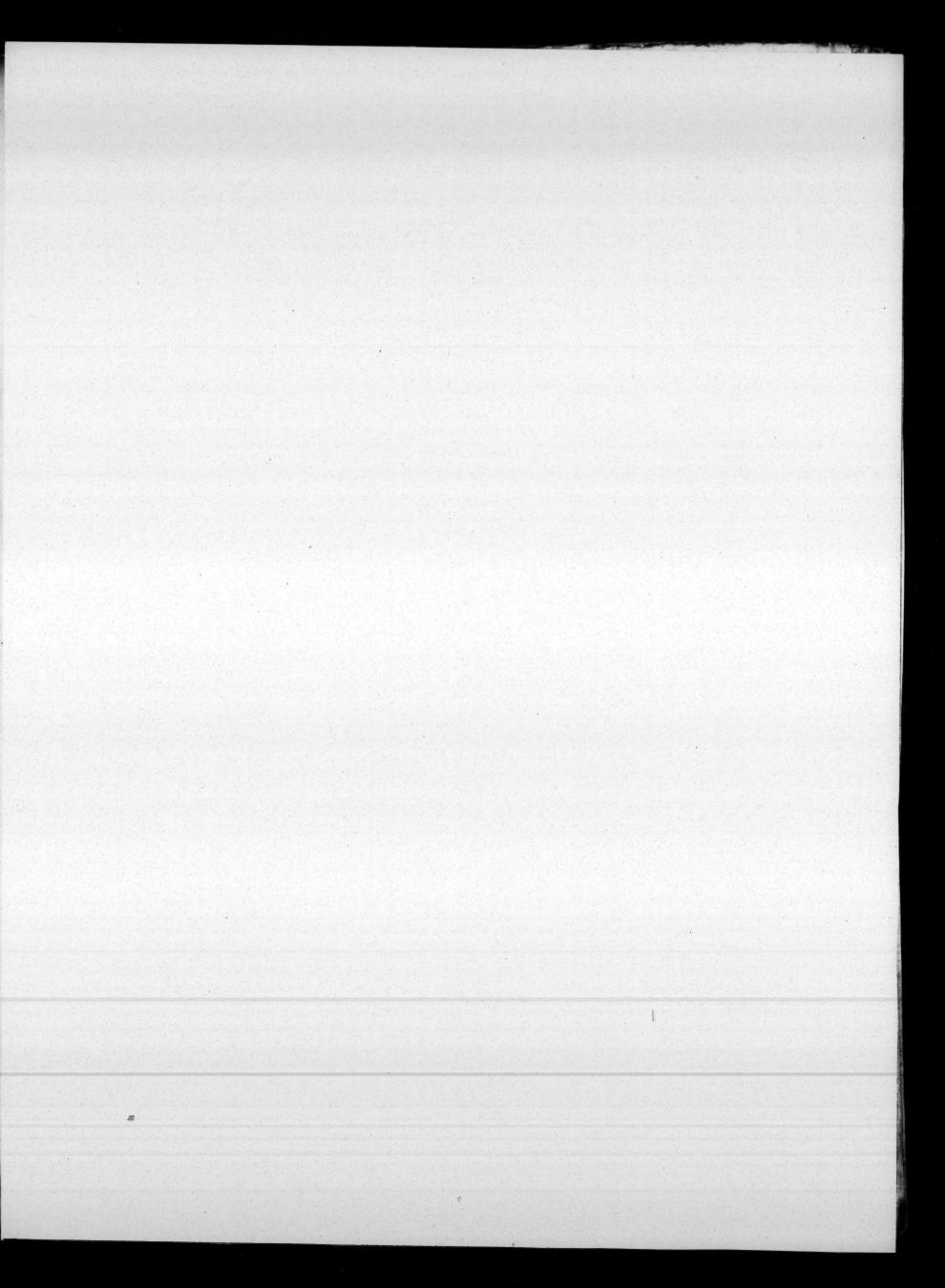
Figure IV.

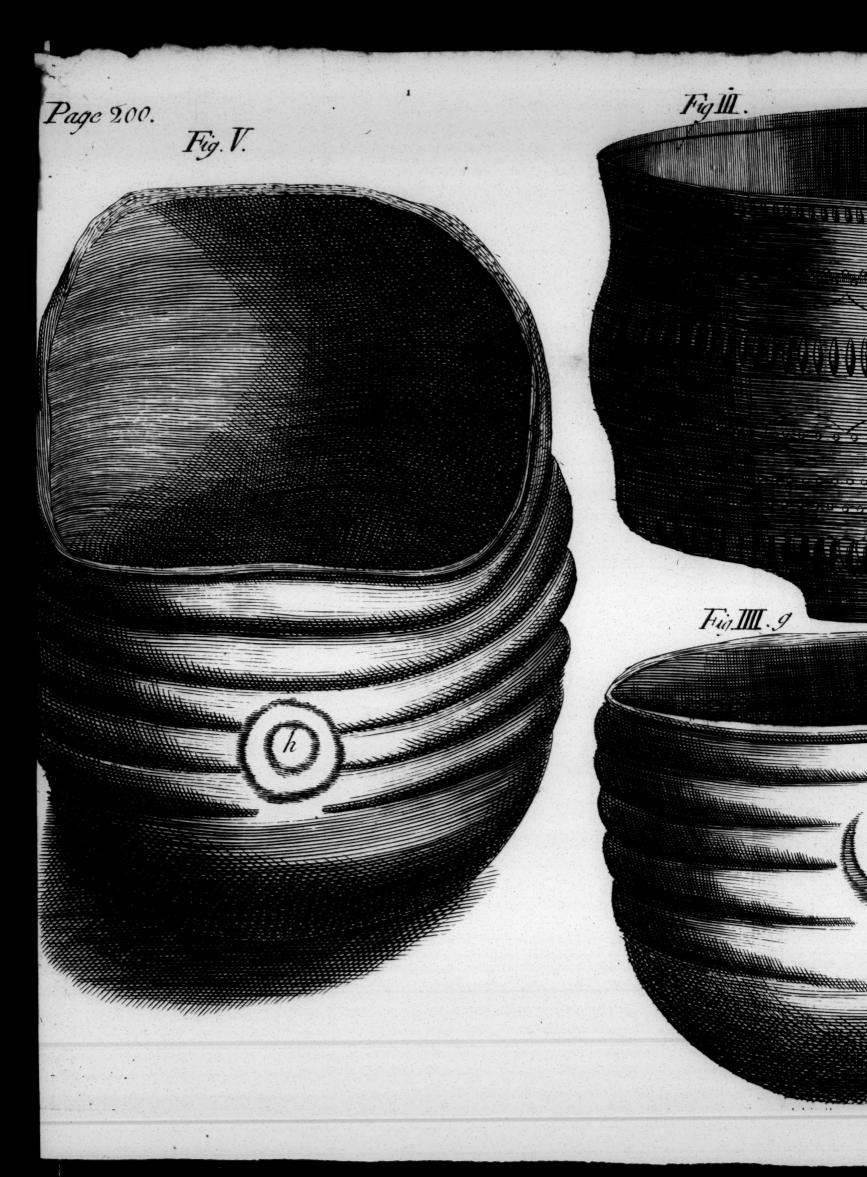
Figure the fourth shews the shape of the urn with that side forward whereon a crescent moon, markt by the letter a was wrought; b, c, d, e, f, are surrows cut for ornament round the upper part of the stone; g, the hollow that contained the bones.

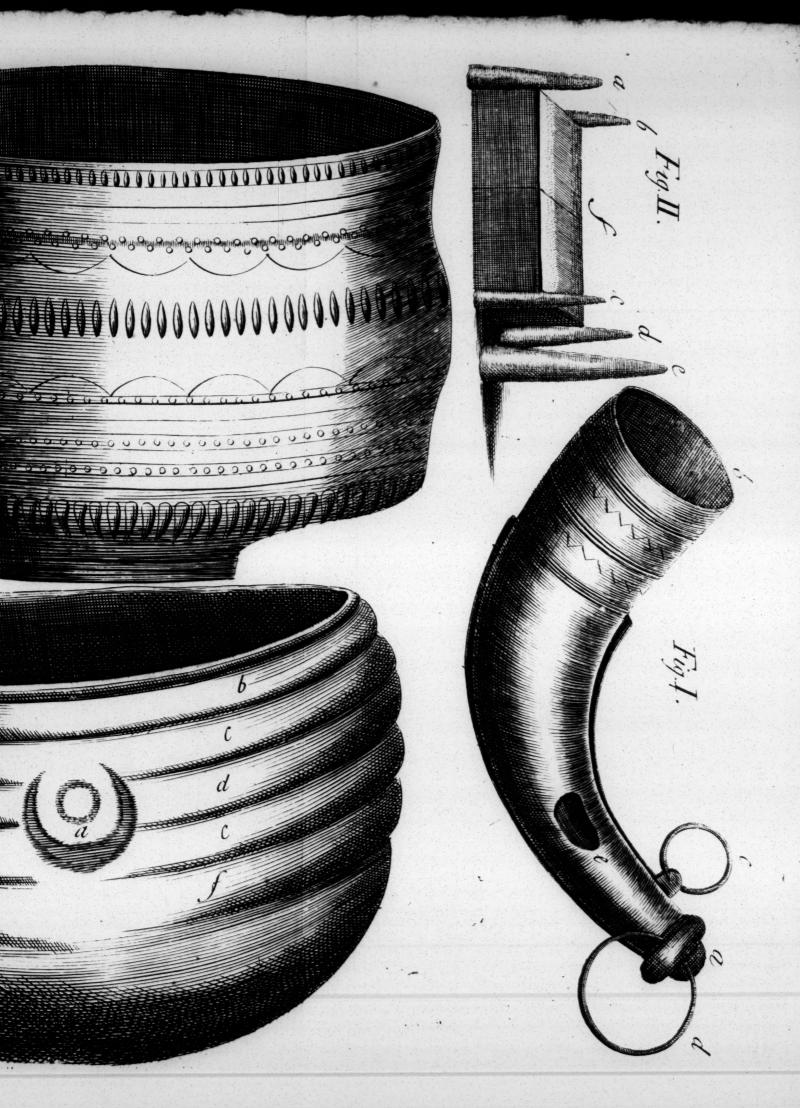
Figure V.

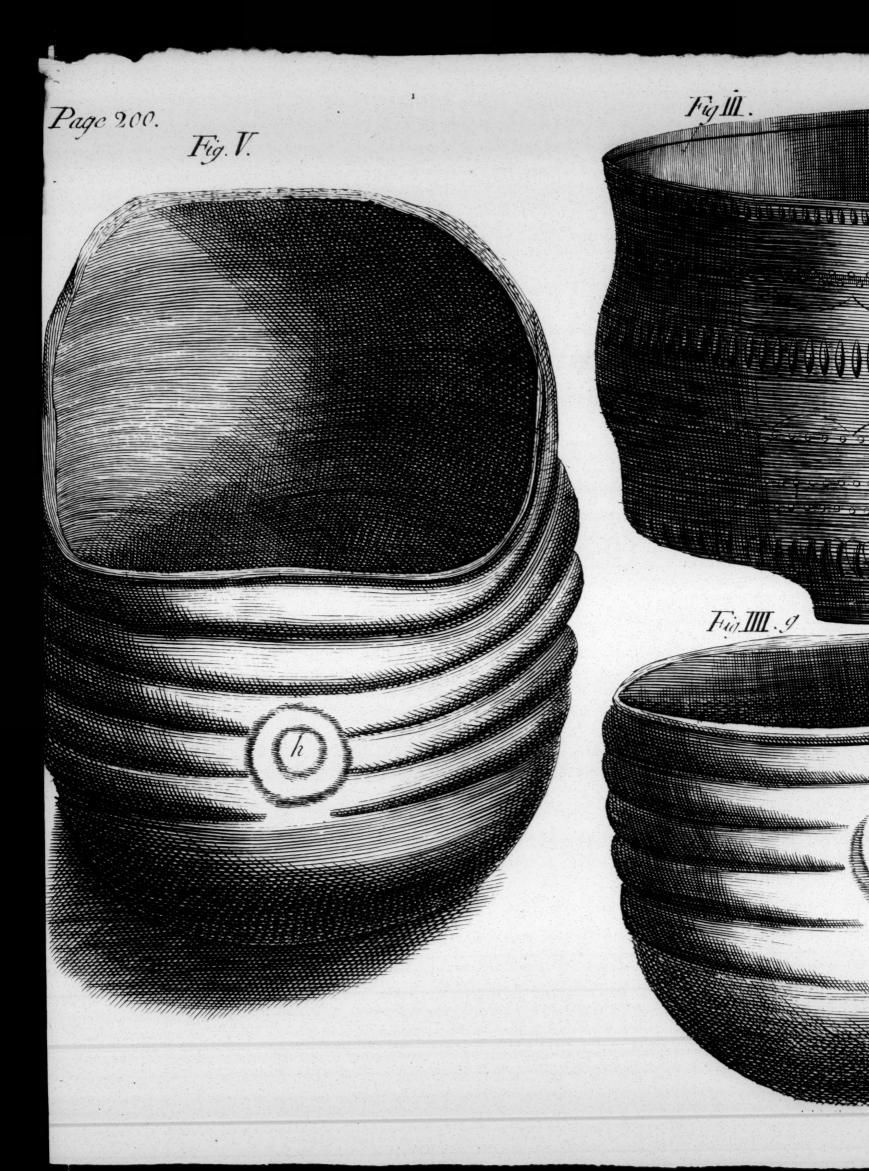
Figure the fifth represents the same urn with its end towards you; on which was rudely carved a roundish figure, by which the artist would express the sun: mark'd by the letter b.

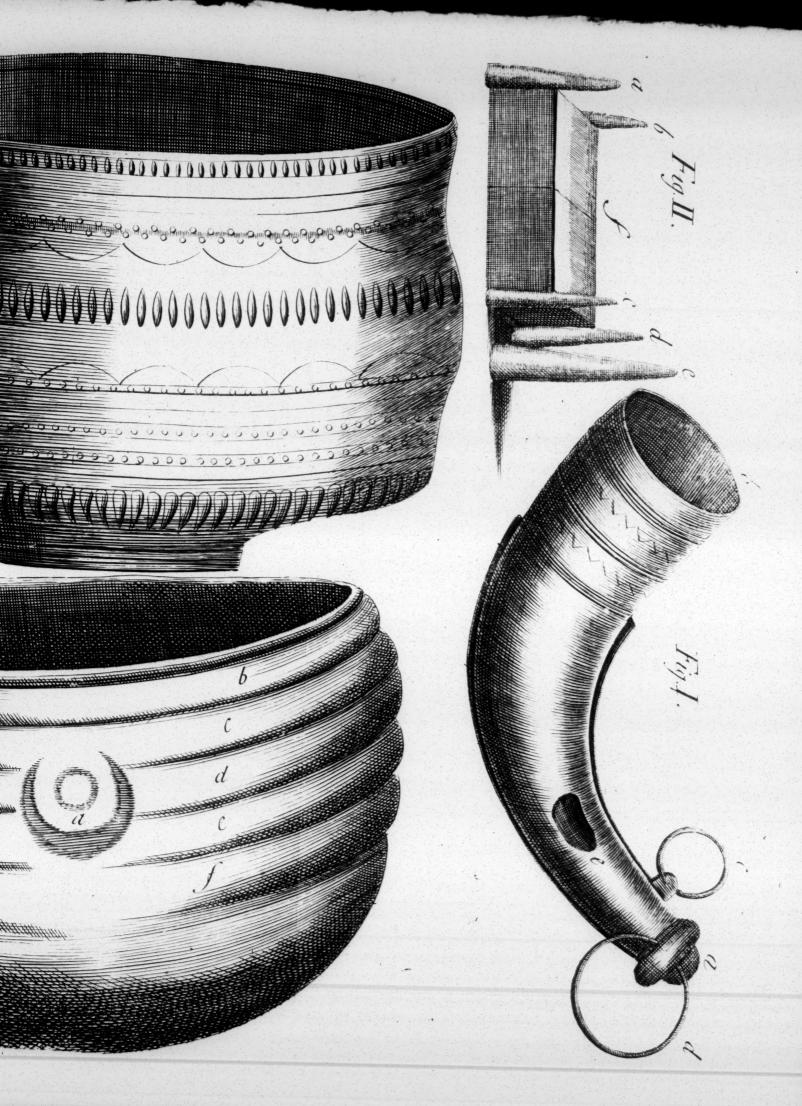
Figure











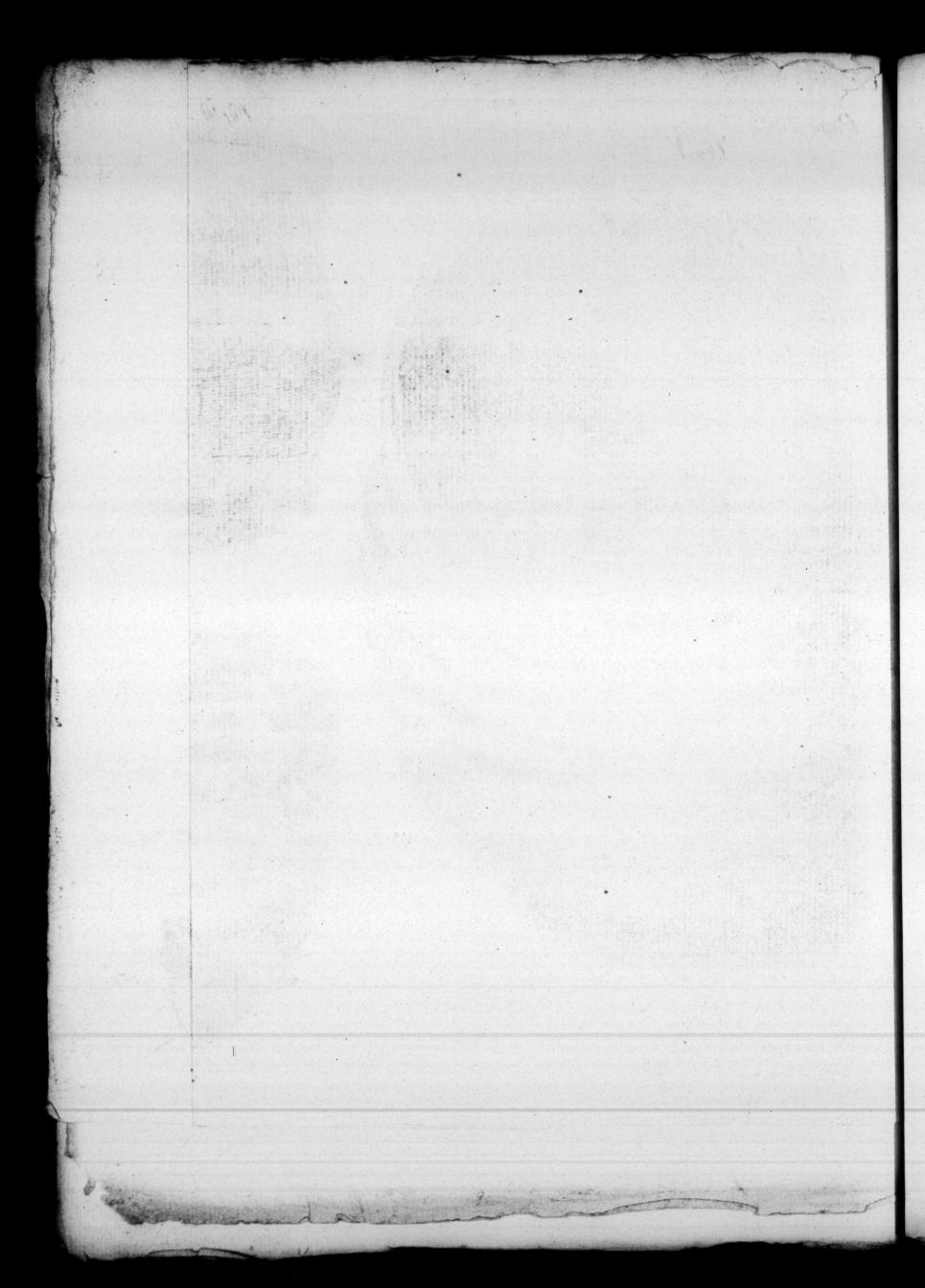


Figure VI.

The urn whose figure is here described, was discovered June 26, 1716. at Stillorgan, a country seat belonging to lord Allen, three miles from Dublin, placed within the hollow of a small grave, two soot long, sixteen inches wide, and about sourteen inches deep. The two sides, and ends of this cavity, were lined with four rude slag-stones set edge-ways, and over these was whelm'd as a covering, one huge massy stone, that ten men could not lift, which lay about two soot beneath the surface of the ground.

When this large stone was removed, which was done with no small difficulty, we discovered several fragments of the bones of a man; as parts of the scull, jaws, teeth, parts of the spine, ribs, bones of the legs and thighs, some of them, particularly a thigh bone, very compleat. These lay promiscuously dispersed, within the hollow of the grave, and by them stood the urn, containing none of the fragments of the bones, nor any thing else, saving some loose earth that ac-

cidentally fell into it, as the workmen were opening the grave.

Considering the small dimensions of this sepulchre, we cannot imagine, that a compleat body of a man could ever be deposited within its narrow compass. So that we must conclude, these bones were reduced to the condition they were found in, divested of all their sless, some time before they were committed to the grave.

However 'tis not easy to account how this might be done, in so remote and barbarous an age, by any other means than burning the body before it was interred, a custom long established, as I before have shewn, among the Danes and o-

ther northern nations, as well as among the Greeks and Romans.

And yet by all the observation we could make, both of the colour, and outward surface of the bones, we could not discover they'd ever past the fire, or that they shew'd any of the usual marks of burning, which in these dry and porous bodies, are easily discerned, and rarely, if ever, are defaced by time. Besides some of the bones remaining so compleat, as we before mentioned, and none of their smaller fragments being deposited, according to the usual custom, within the urn it self makes me inclin'd to think, this body never had been burnt, but that it had lain buried in another place for some time past, and the loose bones, being afterwards collected thence, were here deposited within the compass of this narrow grave; yet to retain some of the ancient fashion of the country, which men don't easily quit all at once, 'twas thought a decency and a respect due to the deceased, to inter an urn together with the bones, tho' it was not apply'd as usual, for the reception of the ashes of the dead.

This grave, with many others of the like kind, were discovered in a small space of ground seated on an eminence, lying southward of the house and gardens, where I conjecture formerly had been raised a Danish fort; for these were always placed upon a rising ground, to have a large prospect every way: and often in some part or other of these forts, the officers and men of note were buried, who in their lives had signalized their courage, in manfully defending these important posts.

And this we are speaking of, seems of more particular regard and consequence than others of that sort; being a guard, to observe and watch the port of Dublin, having as fair an open a view of all the shipping passing to and fro, in this the most frequented harbour of the kingdom, as any part of the adjacent coun-

try could afford.

Befides these urns we have mentioned, many others, from time to time, of various size and shape and differing sorts of work, have been discover'd under mounts and heaps of stones in Ireland; sometimes placed on their bottoms with their mouths upwards, and sometimes downwards, whelmed o'er the fragments of the burnt bones to cover them. But these and such variety we shall pass by, and only now observe, that tho' the way of burning the dead, and putting the remnant of the bones and ashes into urns, was frequent here among the Danes; yet we find likewise the greatest chiefs and princes of that nation, even in the time of paganism, affected sometimes another kind of burial whilst they were here in Ireland; committing to the grave their dead bodies perfectly entire, after the manner of the christians, but still retaining the common custom of their country, of being interred in caves, under high artificial mounts.

Of this way of burial Wormius takes notice likewise, as practised by the Danes at home; but thinks it was of a later date than that of burning. (i) The second age (says he) was that in which the entire corps, not burnt, was placed with all its ornaments in a round hollow, whose sides were made of large stones, and covered with the same at top, over which they heapt so much earth and sand, till it equalled the height of a little mountain, and which at last was adorned on the outside with green sods,

and other stones set round it.

A sepulchre of this kind we have at New-Grange, which for the large circumference, and extraordinary height of the mount over it, the contrivance of the cave within, the outward ornaments that surround the mount, and the two smaller adjoining mounts, is so very singular and remarkable, that it well deserves a

more particular description.

'Tis fituated in the county of Meath and barony of Slaine, within four miles of the town of Drogheda; from its largeness and make, from the time and labour it must needs have cost to erect so great a pile, we may easily gather 'twas raifed in honour of some mighty prince, or person of the greatest power and dignity in his time. I have not heard of any thing of this kind that equals it in Ireland: 'tis a thousand foot in the circumference at the bottom, and round the flat surface at the top measures three hundred foot, it rises in the perpendicular about a hundred and sifty foot; and is seated so advantagiously upon a rising ground, that it is seen from all parts round at a vast distance, and from its top yields a delightful prospect of all the adjacent country.

Olai Wormii monument. Dan. lib. 1. cap. 7. pag. 43. Round

⁽i) Secunda ætas ea fuit qua cadavera integra et non cremata cum suis ornamentis in circulo ex grandioribus confecto saxis locabant, aliisque circumquaque tegebant; arenam et glebam terræ exaggerando usque dum in justam monticuli exsurgeret altitudinem, qui cespitibus et aliis, saxis demum exterius exornabatur.

Round the bottom of the mount, at some distance from it, are raised in a circular order, huge unwrought stones, rudely expressing pyramids, fixt with their basis in the ground, now at unequal distances, because some I suppose have been removed in length of time, and others fall down; neither do they answer one another in height, some being eleven, others not sour foot high; such stones (as we observ'd before) were always marks of honour paid the dead, when they surrounded a mount.

The mount it self is composed of small round paving stones, heapt together so as to form a pyramid, within whose center lies a cave that's somewhat round in figure: to this you can only pass through a narrow hole placed on the north side of the mount, so strait, it does allow an entrance but to one man, and that when on his hands and feet: it seems they industriously contrived this hole should lye concealed, for 'twas but lately discovered, and that by accident in removing part

of the stones to make a pavement in the neighbourhood.

This strait entrance leads into a narrow gallery of 80 toot in length, 3 foot wide, gradually rising in height, still the further it advances from the narrow passage where you enter, there 'tis about 4 foot high, and from thence rises slowly till it is 10 foot in height: the differing heights in this gallery at several distances from the first entrance, must be occasioned by the passage suiting its sigure to the outward conical shape of the mount, which obliged the contriver to make the gallery lower as it was nearer the outside of the pyramid, but the farther it advanced from thence allowed him still to raise its height more, and most of all about the middle of the mount. The walls or sides of this strait gallery are made of large slag stones set broad-ways with their edges close to one another, not hewn or shaped by any tool, but rude and natural, as when they were at first dug from the quarry; they differ in their sizes as the several heights of the gallery require, the top of which is covered over with the same slag stones laid along; some of those in the covering measure full nineteen foot in length.

The furthest end of this long narrow passage, lets you into the dark hollow cave, of an irregular figure, nineteen or twenty foot high, and in the middle about ten foot broad. As you enter the vault, on each hand you have a hollow cell or nich, taken out of the fides of the cave, and a third straight before you. these three cells each are about five foot every way, and ten in height: the walls round the circumference of the cave, and of these side apartments are composed like those of the long gallery, of huge mighty flag stones set end-ways in the ground, of seven or eight foot high; these upright stones support other broad stones that lay along or horizontally, jetting their ends beyond the upright stones; and over these again are placed another order of flat stones in the same level posture, advancing still their edges towards the center of the cave, further than those they rest upon, and so one course above another approaching nearer towards the middle, form all together a rude kind of arch, by way of roof, over the vault below; this arch is closed at top by one large stone that covers the center, and keeps all fixt and compact together: for through the whole work appears no fign of morter, clay or other cement, to join or make its parts lye firm and close, but Cc2 where where a crevile happens, or an interffice, they are filled up with thin flat stones,

split and wedged in, on purpose with that design.

The bottom of the cave and entry is a rude fort of pavement, made of the fame stones of which the mount is composed, not beaten or joined together, but loosely cast upon the ground only to cover it. Along the middle of the cave, a slender quarrey-stone, sive or six foot long, lies on the stoor, shaped like a pyramid, that once, as I imagine, stood upright, perhaps a central stone to those placed round the outside of the mount; but now 'tis fallen down. By this and others of the sort we have before mentioned, it appears the Danes were much addicted to adorn their sepulchres within as well as without, with stones of this rude agulio shape, as the most artful embellishments their wild architecture had then arrived to.

When first the cave was opened, the bones of two dead bodies entire, not burnt, were found upon the floor, in likelyhood the reliques of a husband and his wife, whose conjugal affection had joyn'd them in their grave, as in their

bed.

In each of the three cells was placed upon the ground, a broad and shallow cistern, somewhat round, but rudely formed out of a kind of free-stone; they all were rounded a little at the bottom so as to be convex, and at the top were slightly hollowed, but their cavities contained but little; some of their brims or edges were sinuated or scolopt, the diameter of these cisterns was more than two foot wide, and in their height they measured about eighteen inches from the floor.

The cell that lay upon the right hand was larger, and seemed more regular and finish'd than the rest; for rude as it was, it shewed the workman had spent more of his wild art and pains upon it, than the other two: the cistern it contained was better shaped, and in the middle of it was placed another smaller cittern, better wrought, and of a more curious make; and still, for greater ornament, the stone that lay along as lintal, o'er the entrance of this cell, was cut with many spiral, circular, and waved lines, that with their rude and shallow traces, covered the furface of the stone. This barbarous kind of carving I observed in many other places of this cave, promiscuously disposed of here and there, without the least rule or order; but it was exprest no where with so much industry and profuseness, as on the stones belonging to this cell: yet the they were so lavish of their art, not the least footsteps of writing, or any thing like characters were found in the whole work; which may convince us, that the Danes, then in this kingdom, were not masters of any letters; for had they been, we might be fure they would not have fail'd to exprest them on so remarkable an occasion, as the compleating this extraordinary monument.

The basons in the several niches of the cave, were certainly designed for altars, to offer sacrifice upon to pagan Gods, in savour of the dead: and being three in number, shew they were dedicated to the deities of the three prime idols, religiously adored by all the nations of the north. That this is more than bare conjecture, appears by a passage in the author we have often mentioned,

Olaus

Olaus Wormius, where speaking of the heathen altars of the Danes, he says, (k) They built their altars here with us of various fashions; it rarely happens one single altar is found alone, but often three together, rais'd to the honour of the three chief idols.

The three prime deities most solemnly adored by all the nations of the north, in time of paganism, Abertus Crantius, in his Metropolis, tells us, were the great Thor, Odin and Friga; and describes them thus, as I find him quoted by Olaus Wormius: (1) In their temples they worshipt the statues of three gods; Thor was revered as the most powerful, and next him Odin and Friga: Thor commanded the thunder and lightning, Odin presided over war, and the third, Friga, was the disposer of peace and pleasure: These three were always held as the chief deities of the northern nations.

And hence it is more than probable, that the three altars in the cave we have been describing, must have been raised in honour of these three Danish idols, and the chief on the right hand, so remarkably distinguished from the other two by all its work and ornaments, is likely must have been dedicated to the supreme deity of Thor, as more religiously adored than all the rest.

But the true genuine figure of the cave, and the description of the niches in its sides, and the long entry leading to it, will be far better understood by a plan, which Mr. Samuel Molyneux, a young gentleman of the college of Dublin, delineated with care and accuracy, upon the place, last summer. See

Figure VI.

A is the entrance, from A to B the long narrow gallery or passage, eighty foot in length, leading to the cave C. D D D D. the great flag-stones that make the sides or wall both of the cave and entrance. E E E. the three cells or apartments let into the sides of the cave, for the convenient reception of the three altars or shallow eisterns, F F F. G a second altar, raised upon the lower altar in the right hand cell. H a pyramid stone now sallen, but formerly set up erect in middle of the cave. The situation of the cave, as to its length, stands north and south, its entrance lies directly south; but whether this position may be observed in laying out the caves, and passages that lead to them, in other Danish mounts, and so may be some mark or direction to find out the hidden entrance, to other sepulchres of this kind, surther enquiry may inform us.

⁽k) Ararum structura apud nos varia, raro unicam solam invenies, sæpius tres brevi intervallo a seinvicem distantes, in honorem trium primariorum idolorum erectas.

Olaii Wormii monument. Danic. lib. 1. cap. 3. pag. 7.

(1) In templo stacuas trium venerabantur deorum, potentissimus Thor colebatur, hinclatera ejus cingunt Wodan atque Fricco: Thor tonitrus & sulgura gubernat, Wodan bellis presidet, tertius Fricco pacem & voluptatem moderatur; atque hi tres semper primarii habiti sunt septentrionalium dii.

Ol. Wormii monument. Danic. lib. 1. cap. 4. pag. 13.

Figure

Figure VII.

Figure the 7th shews more particularly the manner and contrivance of the altar in the right hand cell, consecrated to the deity of Thor, expressing all the rudeness of its work. a a a a the upright flag-stones that compose the side-walls. b b b the lintal-stone that's laid a-cross over the entrance of the cell; upon the surface of this stone, the artist has express abundance of rude barbarous fort of sculpture. c c a lower altar serving as a basis to d, another lesser altar raised upon it.

Figure VIII and IX.

Removing, about ten or twelve years fince, some of the heap of stones on the out-side of the mount, two Roman golden coins were found by accident, near the surface, buried among the stones; and in all likelyhood more of that kind may lie concealed, that time may discover hereaster. One was of Valentinian the first emperor of that name; his head on one side of the medal, and round it this legend, Dominus Valentinianus, pius, swiix, augustus: on the reverse, two imperial figures sitting on a throne of state, supporting a globe, as an emblem of the empire, with an image of victory over them, and a branch of laurel sprouting up between them. These figures express Valentinian himself and his son Gratian, to whom the father gave the title of Augustus, upon his obtaining a mighty victory against the Germans at Solicinium, about the year of Christ 368. when Gratian his son was in his company: and, on occasion of this victory, this same medal was struck at Triers in Germany, as appears by the inscription round the reverse, Victoria Augustorum, and the initial letters on the lower part T. R. O B. S. which signify Triveris Obsignata, coined at Triers.

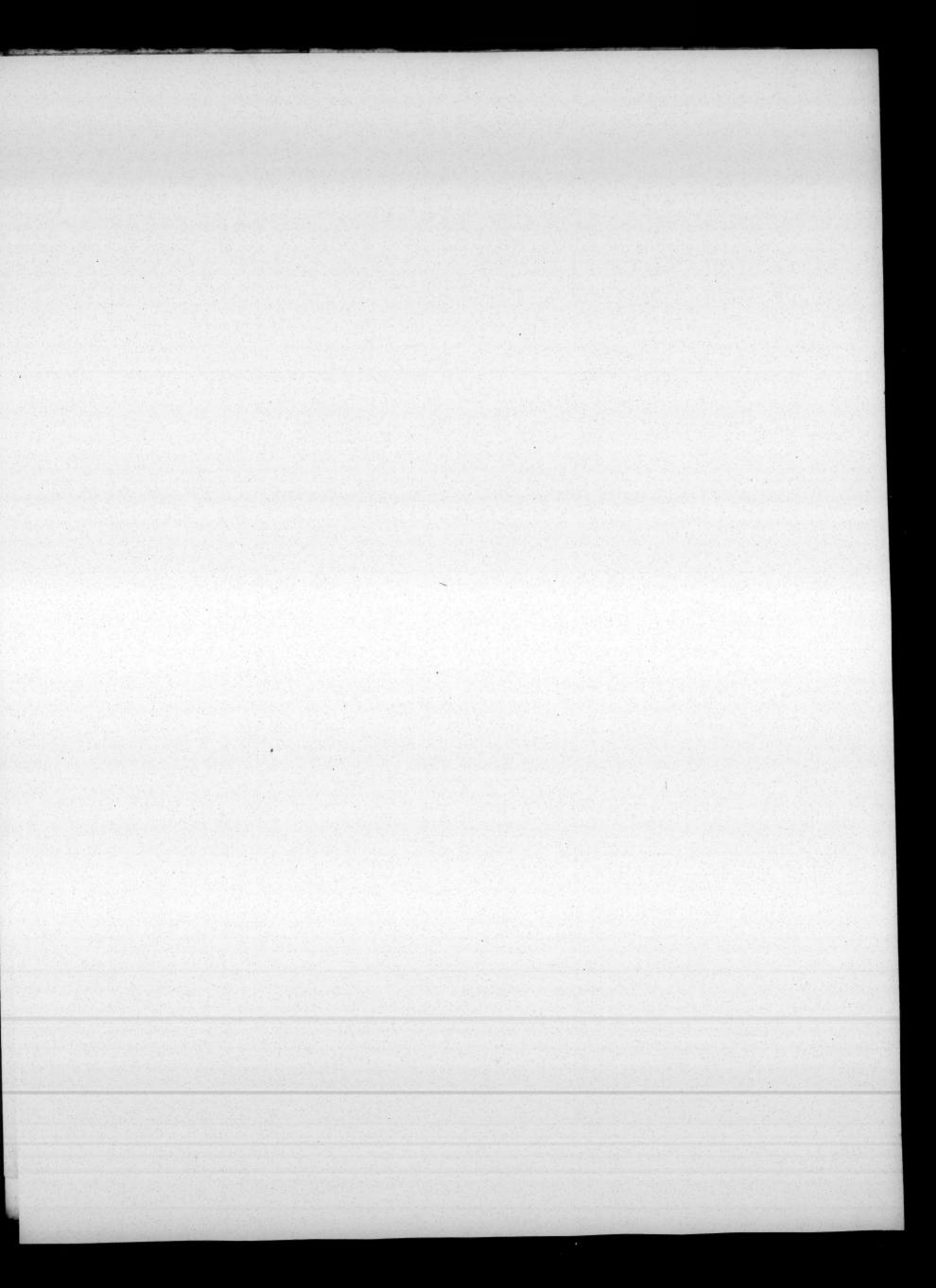
The other golden coin was of the emperor Flavius Theodosius, called the great; his head is on one side, with this inscription round it, Dominus Theodosius pius, switch, augustus; on the other, are two imperial figures on a throne of state, jointly holding a globe with an image of victory, and a laurel between them, as in the former medal, and with the same inscription round them, Victoria Augustorum. These two imperial figures, as I take it, do express Arcadius and Honorius, the two sons of Theodosius, as the head on the other side does the father, who, in consort with his two sons, governed the east and western empire jointly, several years before his death, after they had happily overcome Eugenius: and on account of that great victory, about the year 395, this medal here

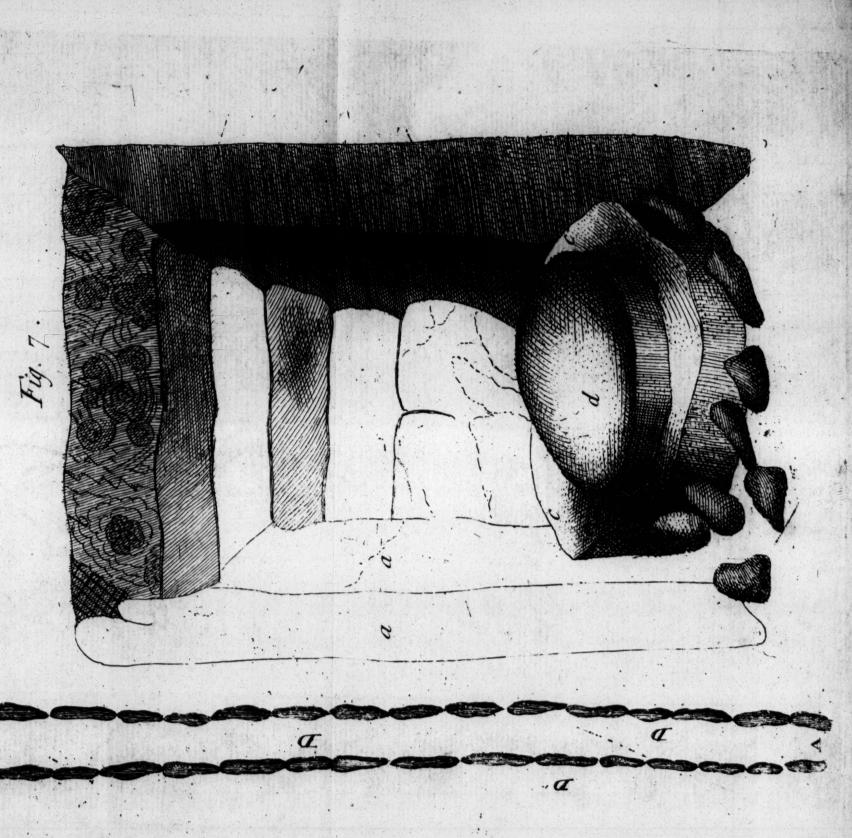
was coined at Triers, as the former was.

Figure the eighth shews Valentinian's coin with its reverse.

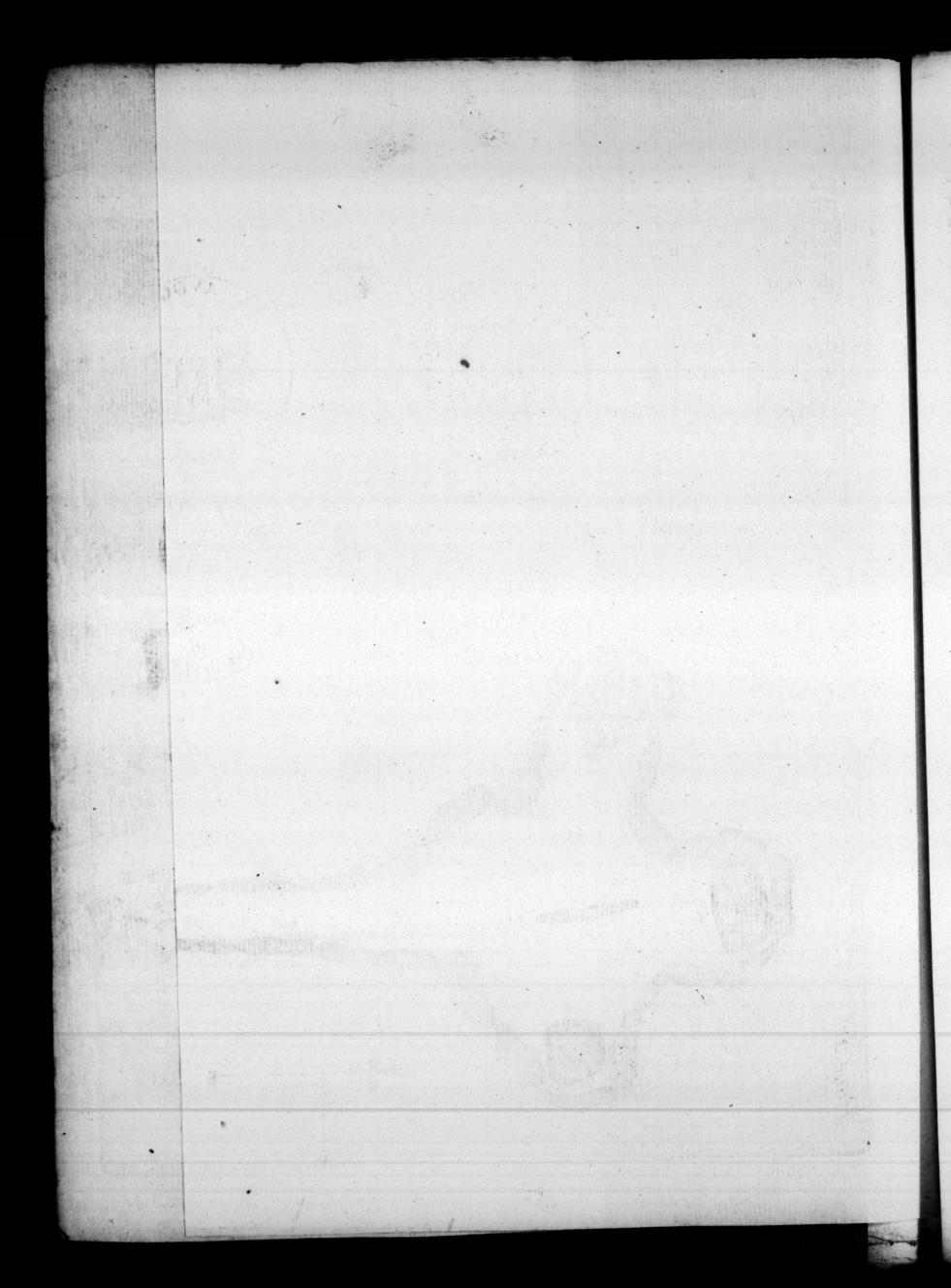
Figure the ninth is that of Theodosius, both taken from the coins themselves, but larger than the originals, that the inscriptions might be the better exprest.

This Roman money, must certainly have been brought into Ireland by the trading Danes, as being the current coin at that time in commerce throughout Europe, and received in exchange for such commodities as these Easterlings carried abroad





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abroad to traffick withal in the neighbouring countries: for 'tis beyond all doubt, that the Romans were never masters of this island; and tho' their gold and silver money are often discovered in several parts of this kingdom, yet they were not dispersed here by the Romans, but by accident dropt, or deposited by design, (as these two golden coins we are speaking of) by the Danes, among the stones of this mount, in honour of the persons buried under it; according to the antient custom that prevailed with that nation, as Wormius testifies, of burying together with those of note and dignity, gold, silver, arms, and such like costly things. (m) Our ancestors, says he, did not only commit to their graves, the corps and ashes of the dead, but likewise with them, spears, arms, gold and silver,

and such like rarities that were dear to them in their life-time.

About a hundred yards distant from this mount, are placed two other pyramids, but of a much smaller fize, not above a fourth part as big, and like it, are both encompassed with a circle of stones, set at some distance each from another, round their bottoms; but these stones bear a fort of proportion to the dimensions of the mount they surround, and therefore are abundantly less than those encompassing the larger mount. These two tumuli being of a smaller size, feem probably raifed as sepulchres for the children, or kindred of those persons that lie buried under the greatest mount, as if the three mounts altogether were designed by way of a family-monument for some great Danish prince, that chose to be interred near his country-dwelling, that might be hereabouts, as the word Grange seems to imply, the name by which the place is called at present, derived from a Teutonick or German word, and no ways of an Irish original. For that the Danes affected to have their burying places close to their country-feats, Olaus Wormius affures us, (n) Our nobility, says he, were pleased to choose to bury near their feats, and on their own grounds. As yet we know not what may be the fashion or inward contrivance of these two smaller mounts, because their caves or passages leading to them have not been hitherto discovered; but such an attempt were easy, by reason of the smalness of the mounts, did any perfon's leifure or curiofity incline them to make enquiries after fuch antiquities. And thus much of the Danish sepulchres in Ireland.

But besides these tumuli or funeral piles, there is another fort of antient work still remaining in this kingdom, and to be met with frequently in many parts of it, that by their round make, and resemblance to these mounts, as well as by the tradition of the inhabitants, shew that they derive their original from the same Danish nation. These are the Danish forts or raths, as some call them, (rath in the Irish language signifying a hill or rising ground) whose outward shape and contrivance having something common with the figure of these

⁽m) Tumulis suis non solum cadavera aut cineres inferebant veteres, sed arma, hastas, equos, aurum, argentum, aliaque defunctis charissima Kenniklas.

Olaii Wormii monument. Danic. lib 1. cap. 7. pag. 45.
(n) Magnates in prædiis ac propriis agris sepeliri gestiebant.

Worm, monument Danic. lib. 1, cap. 6. pag. 31.

mounts, some have taken them for one and the same thing, and consusedly called them by the same promiscuous name. But if we consider these Danes raths more narrowly, we shall easily find so remarkable a difference between them and the mounts we have been speaking of, that 'twill plainly appear, the former were not cast up as funeral-monuments in memory of the dead, but were

designed as forts for security of the living.

For we may observe that these raths, tho' they are circular like the mounts, yet they are constantly contrived with ramparts, ditches, or intrenchments round them, for the defence of those that kept within; whereas the sepulchral hills are not at all encompast with any works of this kind. 'Tis true these latter are round, steep, rising grounds as the former; but then the mounts are heaps of earth and stone, cast up by hand, raised from the surface of the earth it self, and wholly formed by art; whereas the forts, especially the largest, do owe their height more to their natural situation than to art, as being placed upon some rising hill, and are beholden little more to human industry, than for their round sigure and the ditches and intrenchments cast about them, dug out of the hill on which they stand, to make it more secure. Their situation was always high, to have the larger prospect round, that so no party of the enemy could possibly approach them undiscovered, or suddenly surprize them.

They are of various fizes, differing much in magnitude, some so small as not to measure more than fifty foot in their diameter, and as much in height; others are much larger in their dimensions, and take three hundred yards in their circumference; but others are again so vastly spacious, as to contain within their circuit eighteen or twenty English acres at the least; as that remarkable Danes fort called by the people of the country, the king of Ulster's fort, situated not far from the town of Ardmagh. Some have but one wide ditch cast round the bottom, and others are encompass'd with two or three of these, and several intrenchments that divide the ditches; some of these forts are hollowed at the top, or made to sink a little in the middle, that so they might afford the better shelter and defence to all the men within, whilst others are contrived with a high towering mount, that rises in the centre much above the fort, commanding all

the work that lies below.

Of such a one that stands near Down-Patrick, in the county of Down, we have annex'd the figure, as it appears from an adjacent hill, some fixty perches distant, drawn by a scale of an hundred foot to an inch, communicated to me by an ingenious gentleman living in that county, Mr. Samuel Waring. See figure the 10th. A b c expresses three artificial ramparts, cast upon the sides of a natural hill. D d d the mount that rises in the middle of the fort is markt e, and if we'll but imagine this central mount removed, this figure then may represent the manner of those forts that are hollowed in the middle, as most we find are. Some, tho' but sew, are encompass'd round with walls of stone, cast up instead of earth, yet without any morter: two of this sort may be seen at Farmoyle in the county of Long ford.

Figure X.

Many of the larger forts have caves contrived within them under ground, that run in narrow strait long galleries, some of these above twenty six soot in length, sive foot high, and as many broad; these make several returns, and joyn to one another in almost right angles; where they meet, the passage is enlarged, and at the corners form a fort of closets that are square in some mounts, and in others round. The walls or sides of these galleries are made of stones, laid flat on one another, without any mortar to joyn them, like our dry walls; and the passage is covered above with flag-stones laid a-cross, that rest with their ends on the side-walls, which being under ground, and no ways exposed to weather, are very durable, and far less subject to decay, than the strongest walls of lime and stone, tho built with the greatest skill of masonry, that lie exposed and open to the air. The following scheme shews the manner and contrivance of these caves, and how the galleries joyn, and lie to each other in most of these mounts, tho in others, they are disposed sometimes after a differing model.

From a to b, measured about twenty fix foot, b is a square closet that's answered by such another at c, at the end of the middle gallery d, that is just of the same dimensions with the former gallery; this closet opens into a third gallery e, somewhat longer than the other two. These close and hollow passages lying under ground, so strait and small, without all light, could never be designed to accommodate men, nor can we any ways suppose them fit for their reception; so that they must have been contrived for the convenient disposal only of their stores, their arms, provisions, and such like warlike necessaries, that here lay secure from weather, and at hand, still ready for their use, and under such

a guard, that kept them safe from thieves or enemies.

As for the smallest fort of forts, of ten and sisteen yards diameter, they were so low, and of such strait dimensions, they could not possibly receive a number any ways considerable, to form a garison, but rather seem designed for habitations only, and the dwellings of single families, that by the means of these raised situations, lived more secure and safe from sudden onsets of their enemies inhabiting the country round them. And I am inclined the more to savour this opinion, because these smaller forts are so very numerous in some parts of the kingdom, particularly in the country of Down, where they lie so close together, that for many miles they stand in sight and call of one another; and its not improbable, they were dispersed up and down here more frequent than elsewhere, by reason that the Danes, and other northern nations that in those days infested Ireland, first landed in these parts of the island, as lying nearest to the countries from whence they came, and so the most convenient for their settlement; and 'twas from hence they spread, and made incursions into all other parts of the kingdom, till they had reduced the whole to their subjection.

It may not be improper to add to these remarks upon the Danish mounts and forts, some observations on the slender high round towers here in Ireland, tho' they are less antient; since they are so peculiar to the country, and seem remains of the same people the Ostmen or the Danes. These we find common likewise every where, spread over all the country, erected near the oldest churches founded before the conquest; but I could never learn that any building of this fort is

to be met with throughout all England, or in Scotland.

That the native Irish had but little intercourse with their neighbours, and much less commerce with these at greater distance, before the Danes came hither and settled among them, is pretty certain: and that the Danes were the first introducers of coin, as well as trade, and sounders of the chief towns and cities of this kingdom, inclosing them with walls for safer dwelling, is generally agreed on all hands; and it seems no way less probable, that the same nation too must have introduced at first from countries where they traffick, the art

of masonry, or building with lime and stone.

For that there were lime and stone buildings here, before the conquest by the English in Henry II's reign, is certain; notwithstanding some, and those reputed knowing men in the affairs of Ireland, have hastily afferted the contrary. For it appears, beyond all controversy, that these high round steeples we are speaking of, were erected long before Henry II's time, from a plain passage in Giraldus Cambrensis, that was in Ireland in that prince's reign, and came over with his son king John, whom he served as secretary in his expedition hither: he speaks of them in his account of this island, as standing then, and I am apt to think, sew of these kind of towers, have been built since that time.

That author mentioning these steeples gives us this short description of them,
(o) Turres ecclesiasticas qua more patrio arota sunt & alta, nec non & rotunda.
Church-towers built slender, high and round, and takes notice of their model,

as being fashioned after a singular manner, and proper to the country.

And fince we find this kind of church-building, tho' frequent here, resembling nothing of this fort in Great Britain; from whence the christian faith, the fashion of our churches, and all their rites and customs, 'tis plain, were first brought hither; the model of these towers must have been taken up some other way: and it seems probable the Danes, the earliest artificers in masonry, upon their first conversion to christianity, might fancy and affect to raise these fashioned steeples in this peculiar form, standing at a distance from their churches, as bearing some resemblance to the round tapering figure of their old monumental stones and obelisks, their pyramids, their mounts and forts, of which they were so fond in time of paganism.

And Sir James Ware cursorily speaking of one of these round steeples at Cork, in his antiquities of Ireland, chap. 29. pag. 328, says, there prevailed a tradition in that country, that ascribed the building of that tower he mentions, to the Osmen, who were inhabitants of Cork; and we might well presume, that

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had the old native Irish been authors of this kind of architecture, they surely would have raised such towers as these in several parts of Scotland also, where they have been planted and settled many ages past; but there we hear of none of them.

Their figure somewhat resembles those slender, high round steeples, described by travellers in Turky, that are called minarets, adjoyning to their mosques or temples. The tallest of our towers, rise from the ground 100 and 7 foot, others are much lower, differing in degrees of height; for some, and those perhaps the antientest, do not exceed full fifty foot; they commonly are placed upon an eminence, tho' some are found on flats, and in the lowest valleys; their outward circuit, at the bottom, is rarely more than forty two foot round, or four-teen foot diameter, the cavity within the tower seldom exceeds eight foot; so

that the walls are about three foot thick.

The workmen, the better to contrive the fabrick of these steeples strong and compact, have placed the door or passage that leads into them, ten or twelve foot at least above the ground, without any steps or stairs; so that there's no way of getting in without a ladder; hence some imagine this contrivance to have been first designed for the security of such as might in time of danger, and of trouble, retire to these places for their safety: but this seems no way probable, feeing they afford reception for fo few, as not to hold fix men with any tolerable conveniency. And therefore I am perfuaded, the reason of placing the entrance of these towers so high above the ground, must have been only this, that when they did design to creek a firm and lasting building, so ponderous and lofty, after a scheme that did confine the artist to so small and narrow a foundation, they faw themselves necessitated to make the lower part fourteen or twelve foot high, and sometimes more, above the ground, all one entire piece or solid body of lime and stone, without a cavity, the better to support the weighty superstructure that was to rest upon't, and last for many ages yet to come. And truly, most of them are so compactly built, and the materials so artfully put together, that time, which deftroys all the productions of human labour, has yet but very little impaired thele fabricks; and we are fure, that some of them have stood feven or eight hundred years already, to which their roundish figure like a cylinder, has doubtless much contributed.

Clogachd the name by which they still are called among the native Irish, gives us a surther proof of their original, that they were sounded first by Ostmen: for the Irish word Clogachd is taken from a foreign tongue, and being a term of art, imports the thing it signifies must likewise be derived from foreigners, as, were it necessary, might be made appear by many instances; now the Irish word does plainly owe its etymology to Clagga, a German Saxon word, that signifies a bell, from whence we have also borrowed our modern word a Clock: this appellation also shows the end for which these towers were built, for belfries or steeples, where was hung a bell to call the people to religious worship; but the cavity or hollow space within being so narrow, we may conclude the bell must needs be small, one of a larger size, not having room to ring out or turn

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round; which argues too they're ancient, for the larger bells are an invention of

the later times, and were not used in the earlier ages of the church.

These towers the better to let out the sound, and make the bell heard at a greater distance, have all of them towards the summit, sour openings or windows opposite to one another, that regard the several quarters of the heavens, and the they agree much in their shape, yet they so far differ in their model, that some remarkable distinction may easily be observed between one tower and another. The better to conceive this difference that words cannot so well express, we have annext three schemes, that represent three of the tallest and the most compleat steeples of this kind I have seen in Ireland, taken at the several places where they stand, with care and accuracy by Mr. Sam. Molyneux beforementioned.

Figure XI.

Figure the eleventh gives us the upright of the tower belonging to the cathedral church at Kildare, a hundred and seven foot in height, it stands thirty yards distant from the church, and is embellished with better work and more hewn stone than any other I have met with; whence I conclude it of a more modern After I had written thus far, I find in the life of Malachias archbishop of Ardmagh, published by St. Bernard, that a church at Bangor in the north of Ireland, (oratorium lapideum he calls it) was built by that bishop about the year 1140. fome thirty years before the conquest, and was the first church in that country, whose walls were of lime and stone. And he says, that this fort of building gave great offence to the people, who condemn'd it then as an unusual instance of expence and pride. But this we must conclude was only occasioned by its being in a remote country, and the first church of that kind that had been feen in those parts. For that there were buildings and churches of stone and lime raised by the Danes, in other parts of Ireland, long before this, above a hundred years at least, is beyond controversy; as particularly that of the Trinity, or Christ's Church here in Dublin, which was built by Sitricus a Danish king, about the year 1038. as appears from ancient records still kept in that cathedral. And about the same time I judge St. Michael's church in Sheep-street, not far from Christ's-Church, was likewise built by the Danes, with one of these round towers adjoining to it. However, that the Irish might have raised some of these slender steeples fince the conquest, that seem more modern than the rest, as this at Kildare in imitation of the older Danish towers, is not improbable.

Figure XII.

Figure the twelfth shews the tower of Clundalkin church, four miles from Dublin, raised eighty four foot high, and separate from the church a hundred yards.

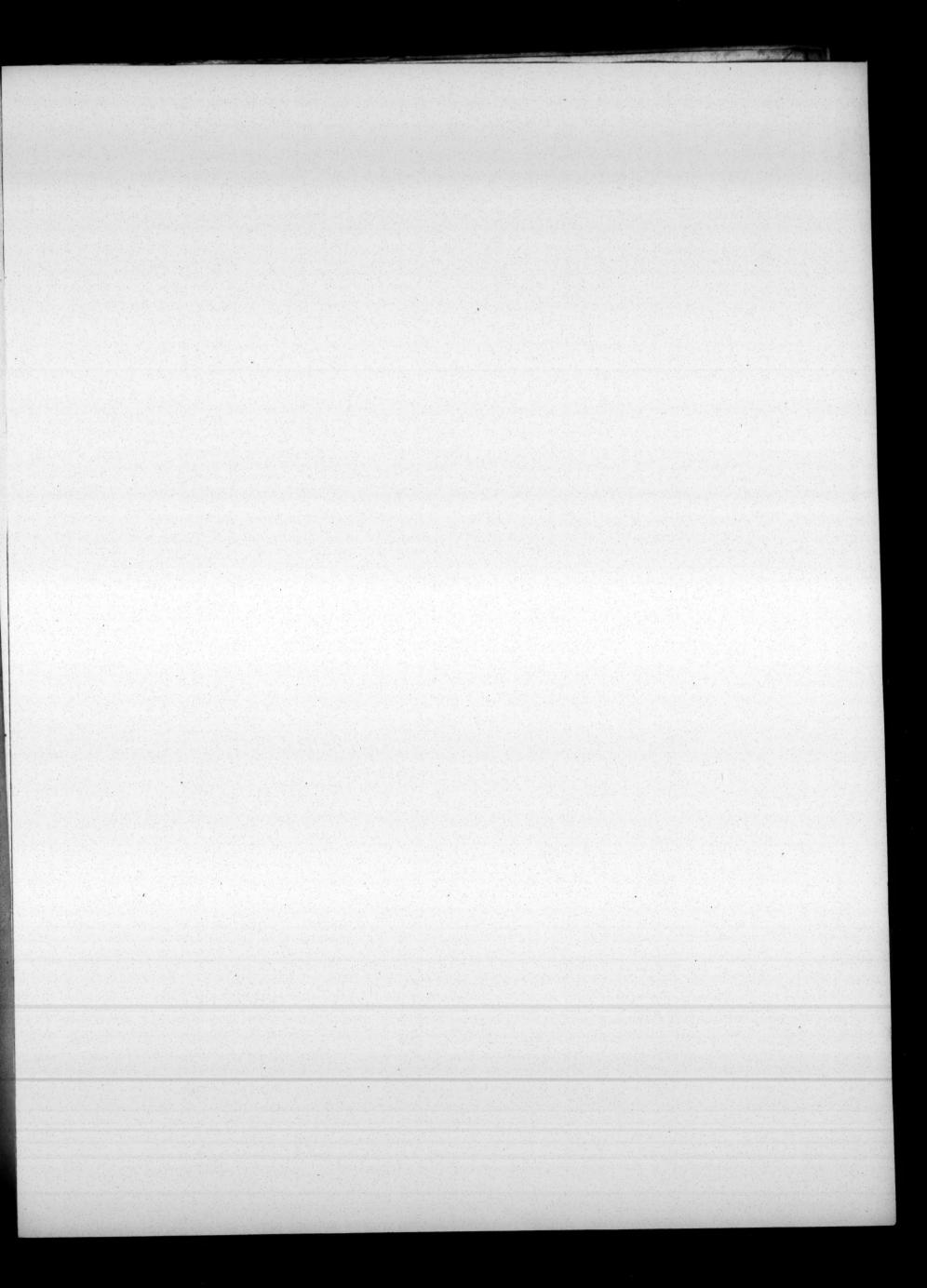
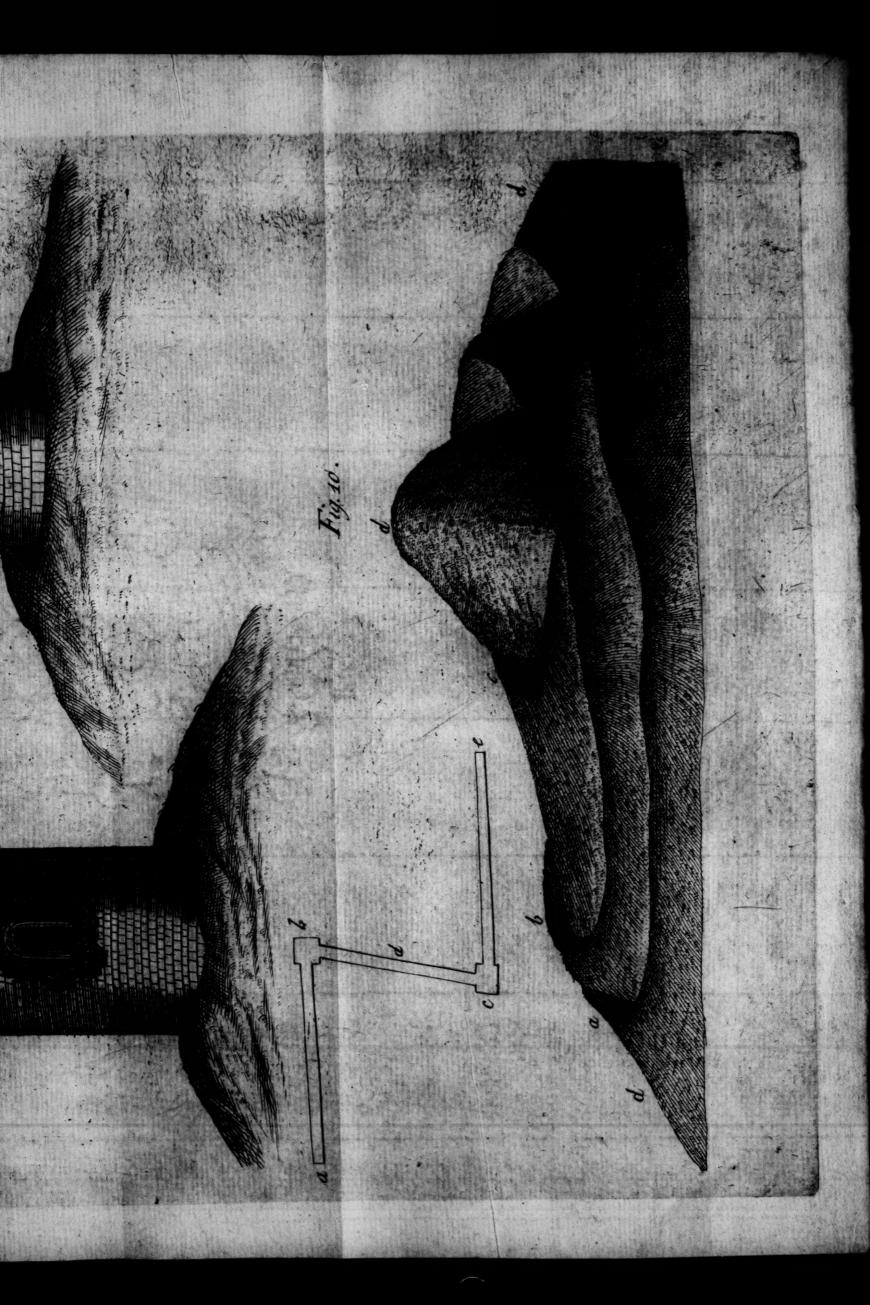
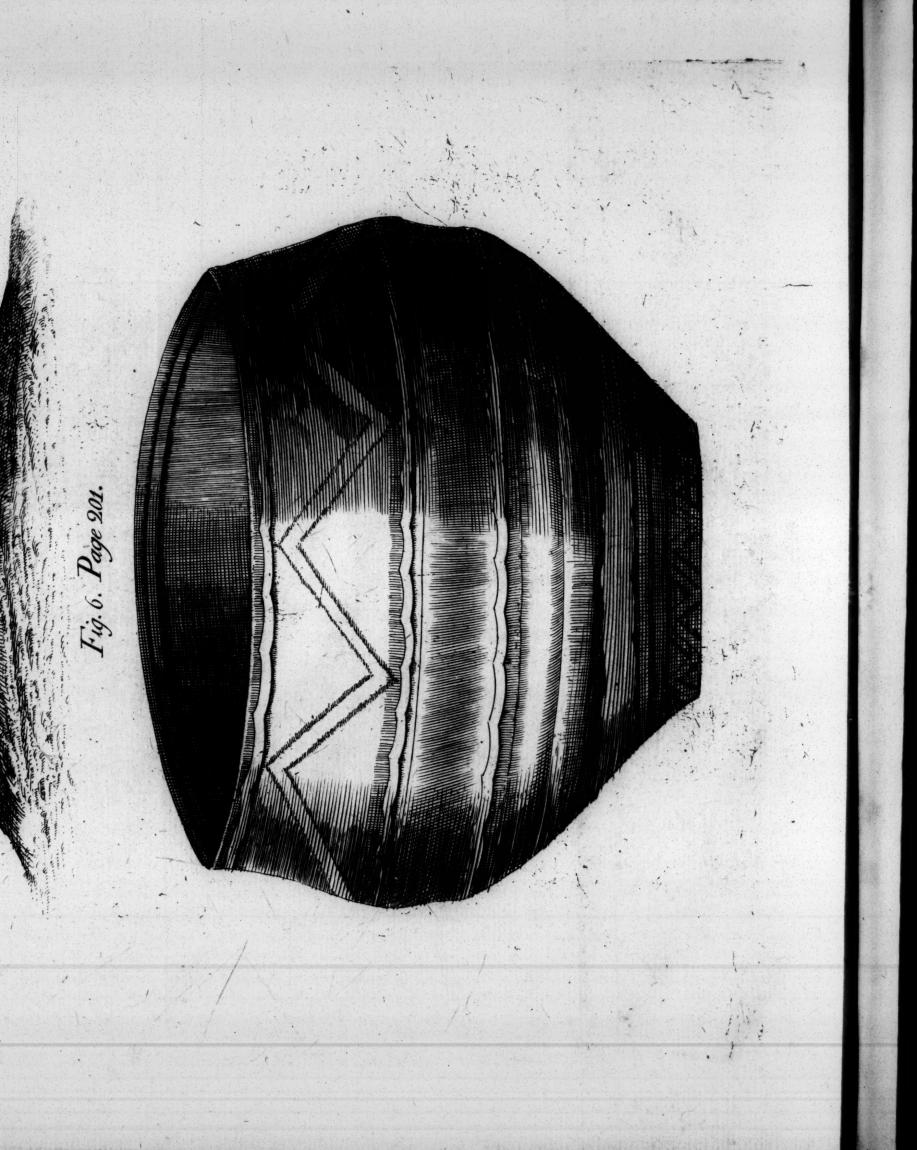


Fig. 12. Fig.11.



Bye 213.



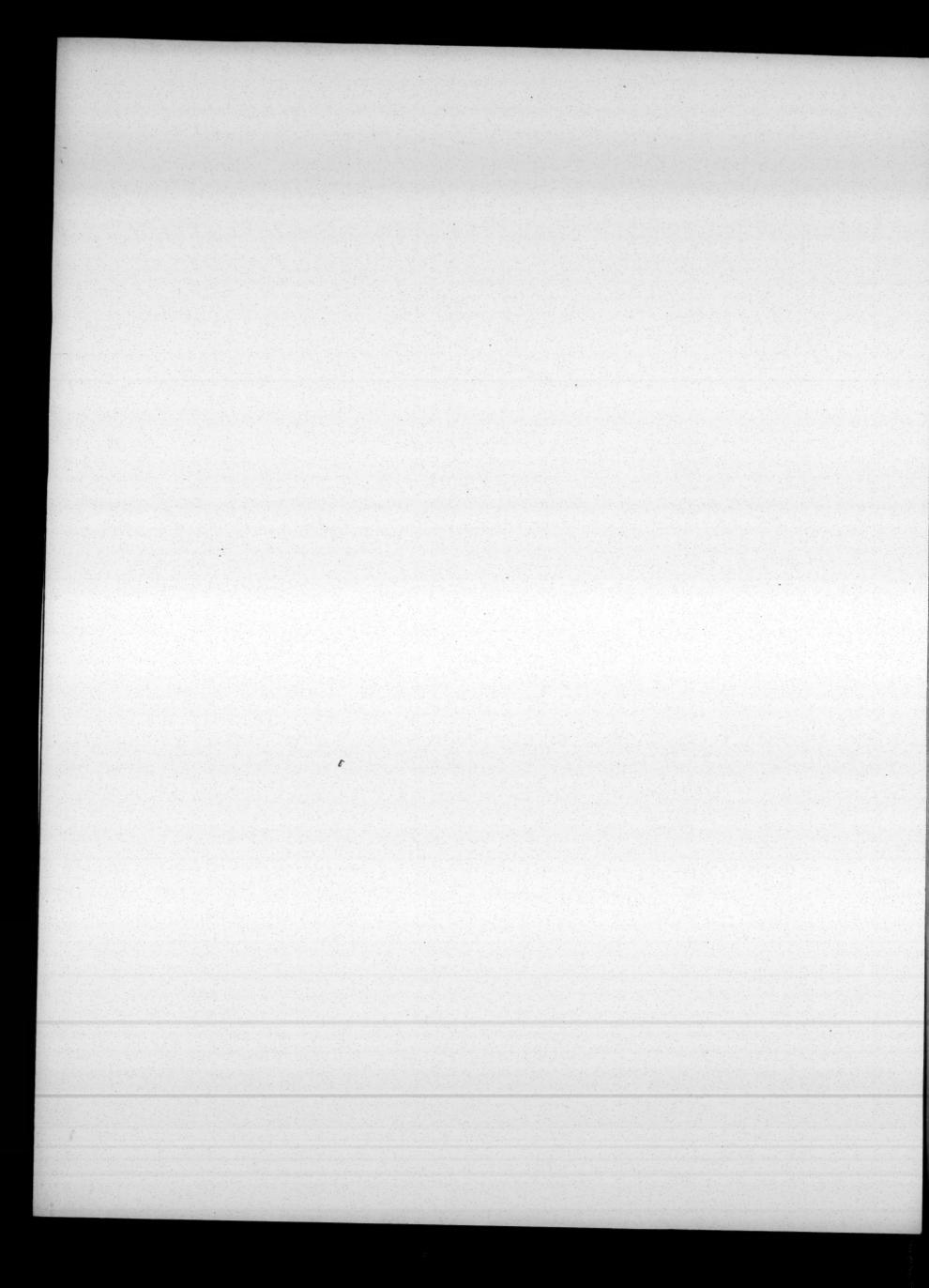


Figure XIII.

Figure the thirteenth is that at Swords, fix miles from Dublin, seventy three foot high, and distant from its church fifty or sixty foot. This is a plainer structure of a more rude and simple make, and more resembles than any of the rest, those pyramidal stones we have so often mentioned, which the Danes accustomed to erect near and about their sepulchres, and likewise upon other memorable occasions, as where they had sought a battle or gained a victory.

a, a, a, in the three last figures are the doors by which they entred into these steeples, placed high above the ground, and must have been at first much higher, before the earth of the church-yards was raised by frequent burials, in so long

a tract of time.

b, b, the open passages near the top, where the bell hung to let the sound

go forth, that they might hear it at a greater distance.

c, c, c, windows, placed irregularly in the fide walls, to admit light to direct those that past up by means of ladders, the only stairs by which they could afcend these towers.

And thus much of the three most ancient, most common, and most remarkable pieces of antiquity we have in *Ireland*, the mounts, the forts and towers, all owing to the *Danes*; lasting memorials for the time to come, of that nation having this country in possession.

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